Model Engineer

THE MAGAZINE FOR THE MECHANICALLY MINDED

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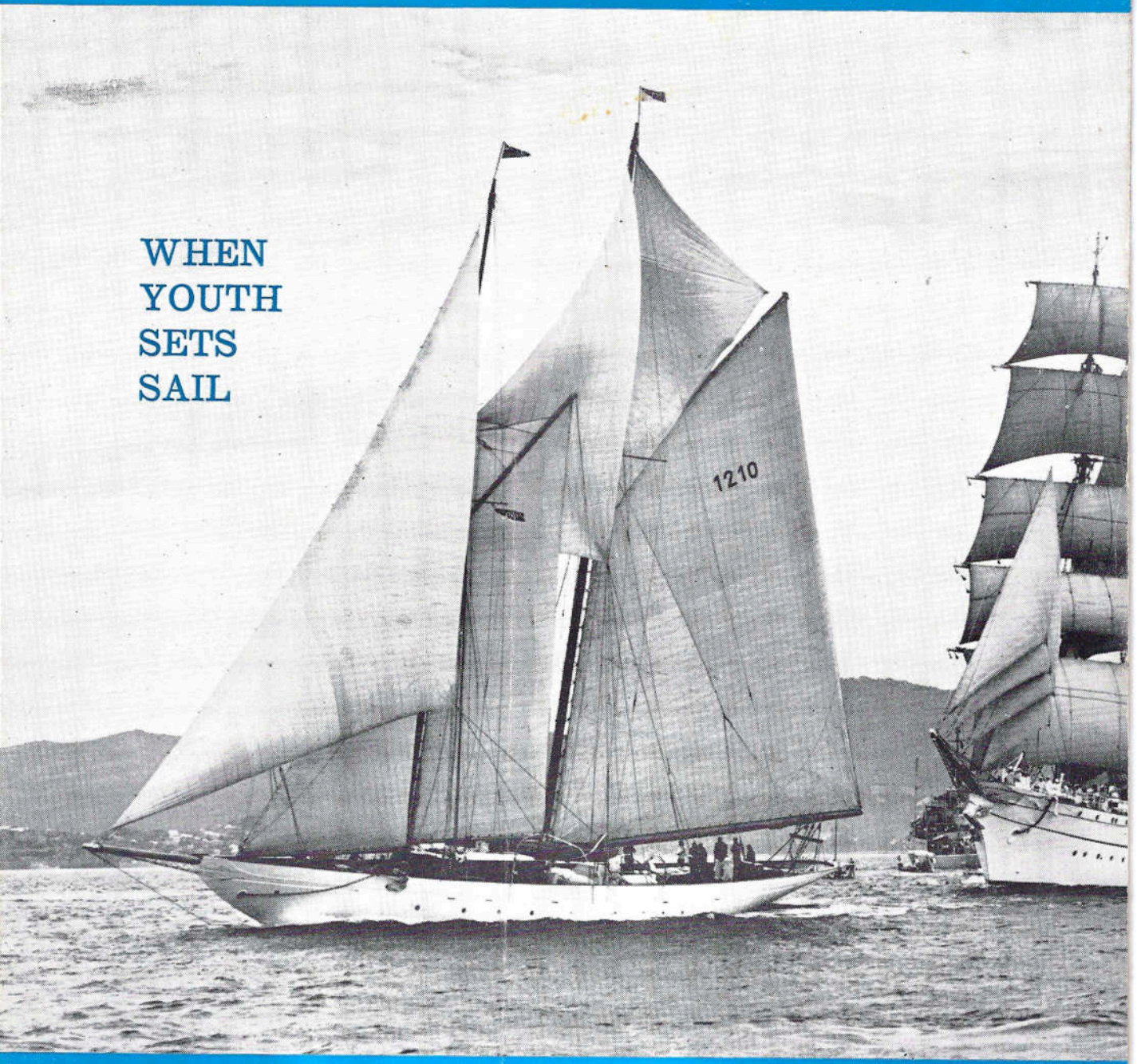

1/3 9 AUGUST 1962 VOL. 127 NO 3187

MORE SHIP MODELLING BOOKS

A SHIP MODELLER'S LOGBOOK *by John N. C. Lewis.* 200 pages. A valuable introduction to lightweight ship modelling written especially for the beginner. After providing some essential background information on the various types of museum ship model and the evolution of the sailing ship through the ages, the author gives practical building instructions for a series of models, among them a decorative half model and a sailing model of a Grand Banks fishing schooner. The book is illustrated with many photographs of the models of the ships described and with fourteen accurate scale plans. In addition, there are over one hundred detailed drawings by the author. **7s. 6d.**, post 9d. (U.S.A. and Canada $2.00, post paid.)

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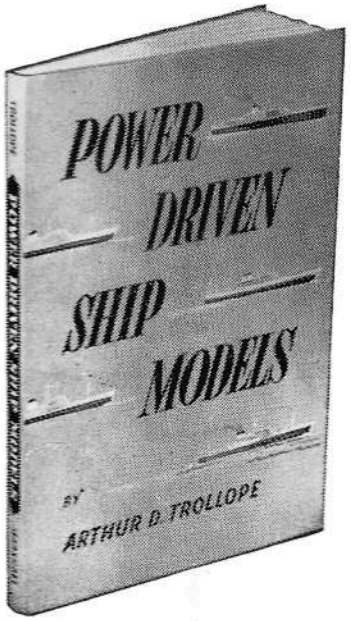

POWER DRIVEN SHIP MODELS *by A. D Trollope.* The author is well known for his articles in MODEL ENGINEER and his successful power boat designs. He is also a judge at the Model Engineer Exhibition and has spent a lifetime in close contact with the technical side of ship ownership, ship design and salvage. The present book incorporates all the "know how" acquired over a period of many years. Very detailed and practical directions are given and the whole project is surveyed with great care and the various alternatives fully discussed. Numerous photographs, drawings and diagrams. **15s.** post 1s. (U.S.A. and Canada $3.50 post paid.)

THE ANATOMY OF NELSON'S SHIPS *by Dr. C. Nepean Longridge.* Describes the construction of the ships of the Nelson period with drawings and the only existing photographs showing the hull construction of two of the ships which actually fought at Trafalgar. Gives a complete description of the masts, spars and rigging of H.M.S. *Victory* and tells of how the author built his important model of her. A series of five large scale folding plates, showing both hull and rigging, complete what is undoubtedly a most comprehensive and reliable book. 272 pages. **63s.**, post 1s. 9d. (U.S.A. and Canada $12.50, post paid).

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MODELLING TUDOR SHIPS *by R. K. Battson.* A more advanced book than *Period Ship Modelling*, but intended to be complementary to it. Whereas the elementary book made no attempt to describe the construction of a planked model, this one does. It also goes more deeply into the Naval architecture of the period and the various changes that took place. Numerous drawings and diagrams. **4s. 6d.** post 5d. (U.S.A. and Canada $1.25 post paid.)

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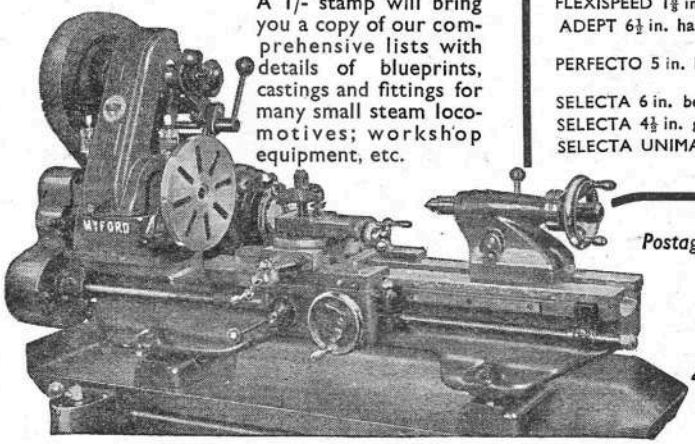

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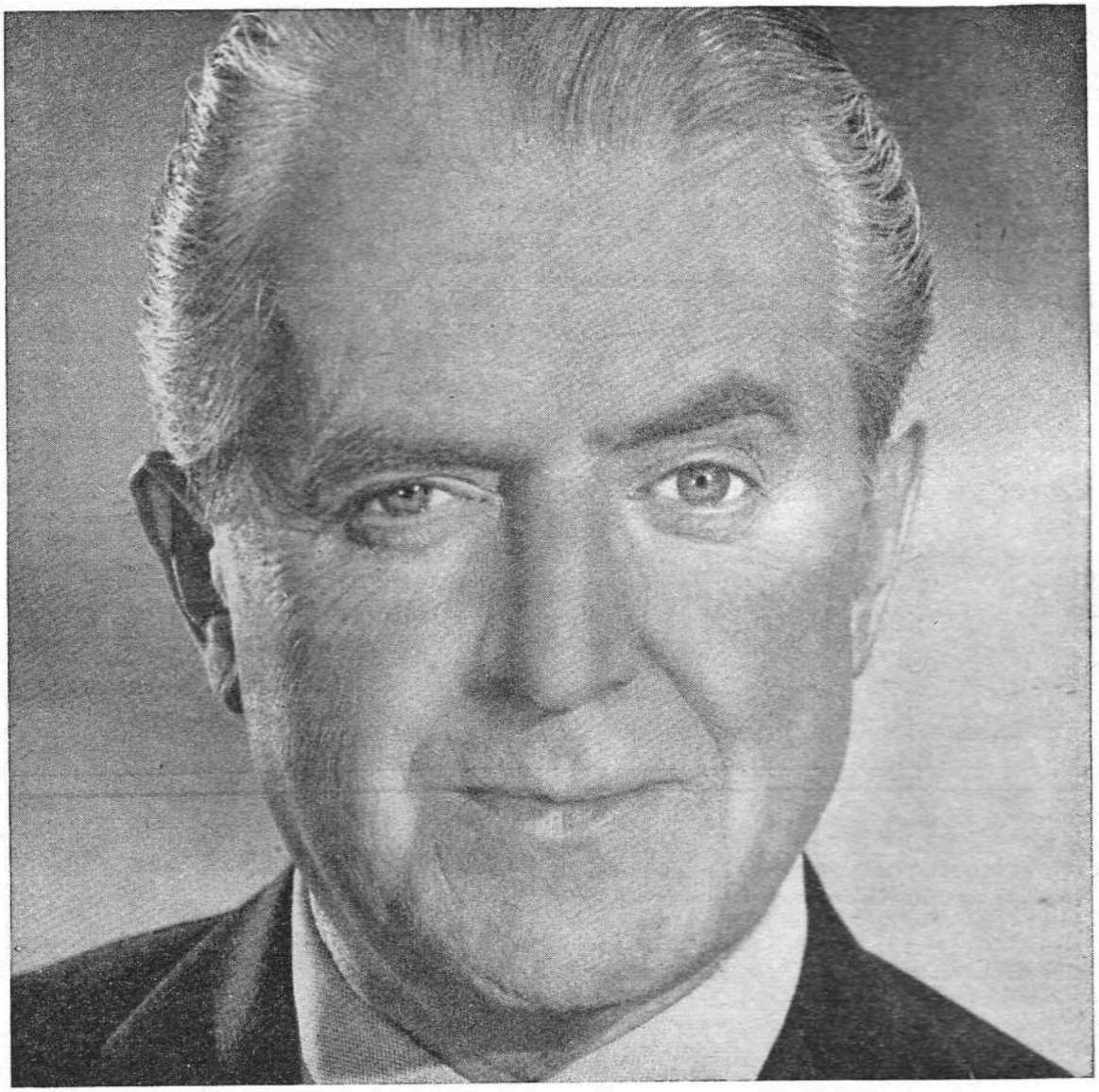

ONE OF THE THINGS that stand out about road accidents is that the vast majority are caused by ordinary decent people – like you and me. There's no deliberate wickedness – it's just that someone gets careless or absent-minded or impatient for a moment, someone who normally wouldn't hurt a fly, and that's it – with possibly a terrible tragedy resulting.

So please, when you're driving, cycling or walking, don't just think it's up to other people to be more careful. Bear in mind that it's up to *you*, too.

Jack Warner

This is Road Training Year—not just for other people but for *you*. Make sure that you and all your family—as pedestrians, cyclists and motorists—take advantage of the special road training facilities now available. Ask your Local Authority for details.

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9 Aug. 1962 Vol. 127 No 3187

Model Engineer

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Cover picture

Heeling a few degrees to a slight breeze, the ORION *leads the* GORCH FOCK. *Ships like these will be lining up in two days' for the race from Torbay to Rotterdam, organised by the Sail Training Association, who hope to raise* £300,000 *for a national topsail schooner.* *See page* 182

Next week

Taking pictures of models and workshop equipment can add greatly to the fun of model engineering, and it need not involve expensive apparatus, as Dr N. F. Hallows explains in a two-part serial, the first half of which appears in ME for August 16

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Smoke Rings — A weekly commentary by VULCAN

IS it wise to retire at 40? Is it wise to retire at all? On the day when these questions were discussed in a London newspaper MODEL ENGINEER welcomed a visitor who could have answered them with confidence.

Mr Thomas Pesci has no qualms about his coming retirement; he intends to enjoy it.

Many years ago he founded a business, the PKD Print Block Company of North Howard Street, Philadelphia. The company is thriving—last year one of its orders amounted to 225,000 dollars—and he thinks that the time has come for him to step aside.

What will he do with the years ahead? His son, Tom Pesci Junior, who has a farm in Bucks County, about 20 miles out of Philadelphia, thinks that the place could do with a little steam railway.

Help from children

Mr Pesci is going to build it, with the strong support of his son and grandchildren. When he stopped in to see us he was on his way to the Continent—still occupied with company business, and full of sunny vigour.

"My son," he said, "told me that I must on no account visit England without calling on MODEL ENGINEER."

The railway in the garden, besides providing Mr Pesci with a happy task for his retirement, will keep all the family interested, with the three generations sharing in the fun.

Toronto, too

Hardly had Mr Pesci stepped out of the door, than Mr Tite arrived.

Mr Dennis R. Tite was on vacation from Toronto. He is a Leicester man, of a family known also in Birmingham and Manchester. After serving with the RAF in Canada during the war, he decided to make his home in the Dominion.

During his holiday he has been

Mr Thomas Pesci from Philadelphia has no qualms about his retirement

looking for a model steam locomotive which he could take back with him.

The difficulty, as he says, is ordering an advertised engine by post is that it may prove to be unsatisfactory. Most of the models advertised in ME are of the expected quality, but it is obviously impossible for every article to be examined before the advertisement is accepted and published.

Our advice to Mr Tite was that he should communicate by air mail with the secretary of the model engineering society nearest to the advertiser's home. The societies are well acquainted with most of the little engines in their own area.

When a prospective overseas buyer does not know the name and address of the secretary—or, for that matter, the name of the society—MODEL ENGINEER will forward his letter if it is sent to this office.

Secretaries and members can be relied upon to help their fellow modellers by discovering what is inside the poke.

BR closures

LAST week I spoke of the possible consequences to the privately-owned Bluebell Line if British Railways close the Ardingly branch which runs from Haywards Heath to Horsted Keynes.

Robin Orchard now reminds me that if BR go ahead with the wholesale closures in Wales which are at present under review, the historic Tal-y-llyn will be without railway access.

Though the Tal-y-llyn, of which Lord Northesk is president, depends for its existence on summer visitors, many of whom doubtless arrive in their own cars, numbers of passengers travel to it by regular railway services and by the annual Tal-y-llyn Special.

If the old Cambrian line from Aberdovey is shut there can be no more trains or specials serving this narrow-gauge railway.

Festiniog, too

A similar fate may also overtake the Festiniog if the Barmouth-Pwllheli portion is closed.

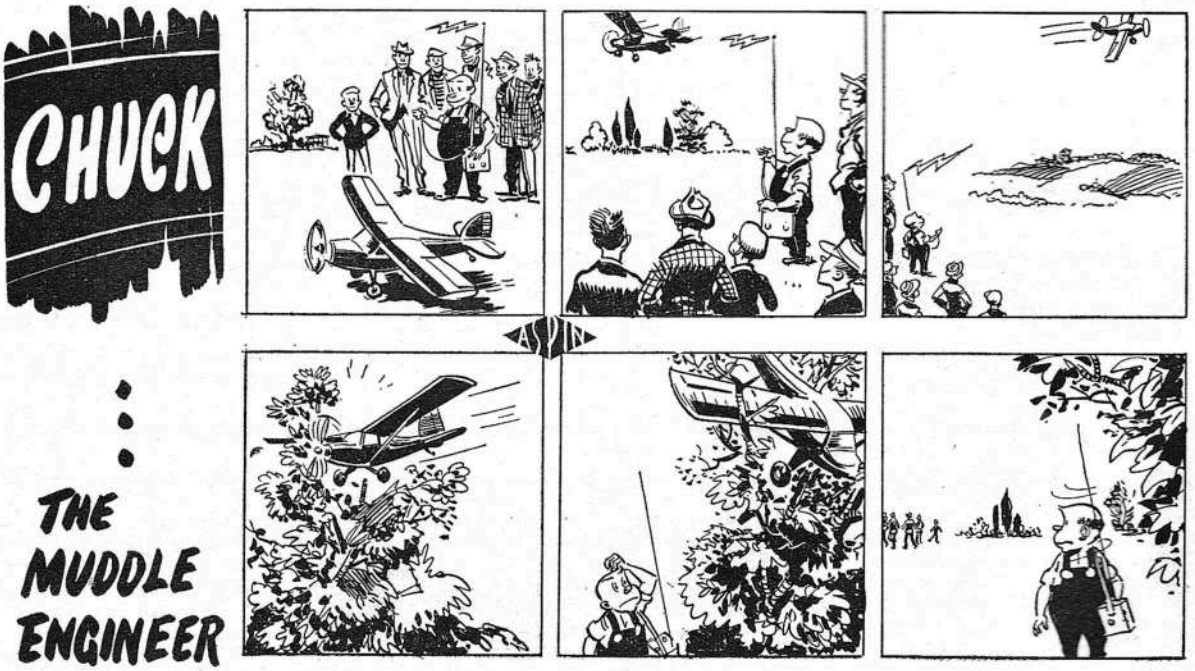
As I remarked in my earlier Smoke Ring, this trend is world-wide. It is depressing to us at Noel Street, but it must be worse to many of the staff of British Railways—and in that phrase I include executives—who have a deep love for the permanent way. I am sure that they do not take these decisions lightly, whatever some may think.

ME Exhibition

AT this time of year we should be rolling up our sleeves in preparation for the Model Engineer Exhibition.

But there will be no Exhibition in 1962, for it was impossible to hire a suitable hall. The next one will be at Central Hall, Westminster, in 1963.

There is one consolation. We at Noel Street have arranged our holidays at a normal time this year!



NO SIGN OF SINKING!

When Norman Kimbrey's Moorcock—a brilliant first attempt—was shown at the Model Engineer Exhibition, many doubted if she would float. Since then LESLIE B. HOWARD has seen her on a London pond

IN modelling a boat, if you try as far as possible to follow the method by which the full-size craft was built your model should prove highly satisfactory.

Norman Kimbrey, a 26-year-old employee of the Port of London Authority, can vouch for that. His model of *Moorcock,* constructed and plated with critical regard for the big vessel, is an oustanding success.

Although he works in a London dock, he had not seen the *Moorcock* before he began his model, for the tug is normally operating in the Gravesend area of the Thames. He chose her as a subject because he liked the serial in MODEL ENGINEER, and also because Oliver Smith, author of the articles, teaches at the model engineering class at Bethnal Green Institute, which he attends.

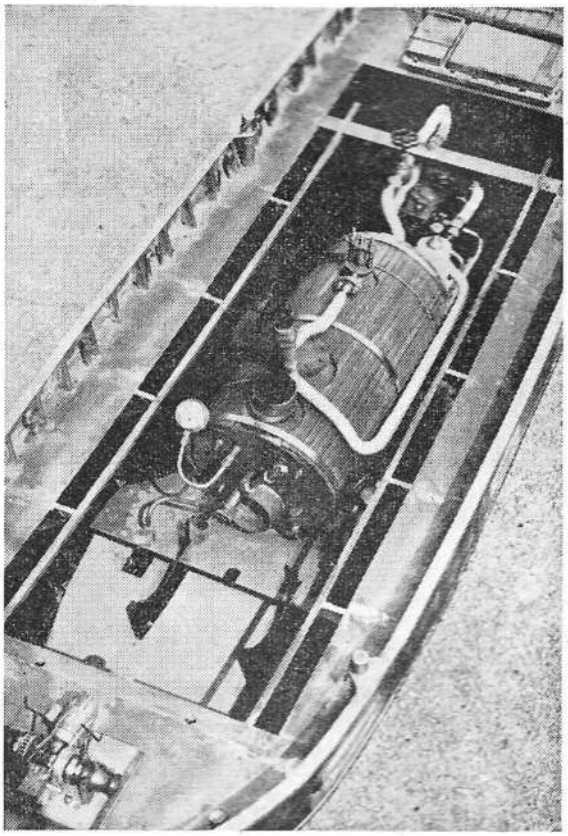
But since building the model he has seen the big *Moorcock* on two occasions. One visit was at the special invitation of the owners.

There were two scales published with the serial; Mr Kimbrey chose the larger, ½ in. to the ft.

He made the model entirely from the drawings and photographs published in MODEL ENGINEER. As this was his first attempt with a metal hull, Mr Smith gave him some practical advice on points of construction.

In the serial, Mr Smith described four ways of making the hull. Mr Kimbrey chose the plated method as it was more in keeping with the full-size tug. He used brass, in preference to sheet tin or mild steel, because it was easy for him to obtain it.

At the last Model Engineer Exhibition the hull, and part of the superstructure, were on show. Many



visitors praised Mr Kimbrey's workmanship. But several regarded the heavy brass with undisguised scepticism and prophesied that it would not sit properly on the water. The extreme pessimists suggested that when the metal superstructure was set up and the engine installed the whole would promptly sink at the launching.

I am happy to say that these dismal forebodings were ill-founded, for when the model tug was tried on the Victoria Park boating pond she sat remarkably well on the water. Some trifling trim may be necessary at a later stage, but, as can be seen from the photographs, it will be extremely small.

Basically, the model follows the plans published in MODEL ENGINEER, with one or two additional refinements. Mr Kimbrey's radar scanner rotates, driven by a battery and small electric motor, and there are vent pipes round the bulwarks, an addition which Oliver Smith felt need not be included in the ME plans.

All the plumbing from the fresh water tank on the boat deck is complete with wheel valves. The fire-fighting monitor is included, and there is also diminutive switch-gear to control the windlass.

The versatile Stuart Double 10 powers a three-bladed propeller of 3 in. dia. With this, Norman departs from the full-sized *Moorcock,* which is fitted with a four-bladed propeller. He is toying with the idea of trying a four-bladed screw of similar diameter.

This is one aspect of modelling where scale cannot help. The right propeller for any craft can be found, in most instances, only by trial and error, for so many factors are involved, including engine revolutions per minute and the hull design and displacement.

The ME Trident boiler, heated by a blowlamp burner, supplies steam to the Stuart. The boiler has been carefully lagged with mahogany strips, held in place with brass straps. At present a hand pump takes care of thirst, but later Mr Kimbrey will fit a steam pump.

Under test, the model reached three knots with a boiler pressure of 50 p.s.i., which I think is quite fast enough. In fact, a little less speed would be more to scale. Anyway, this performance establishes the point that the Stuart Double 10 has enough energy to move the 90 lb. tug through the water without stress.

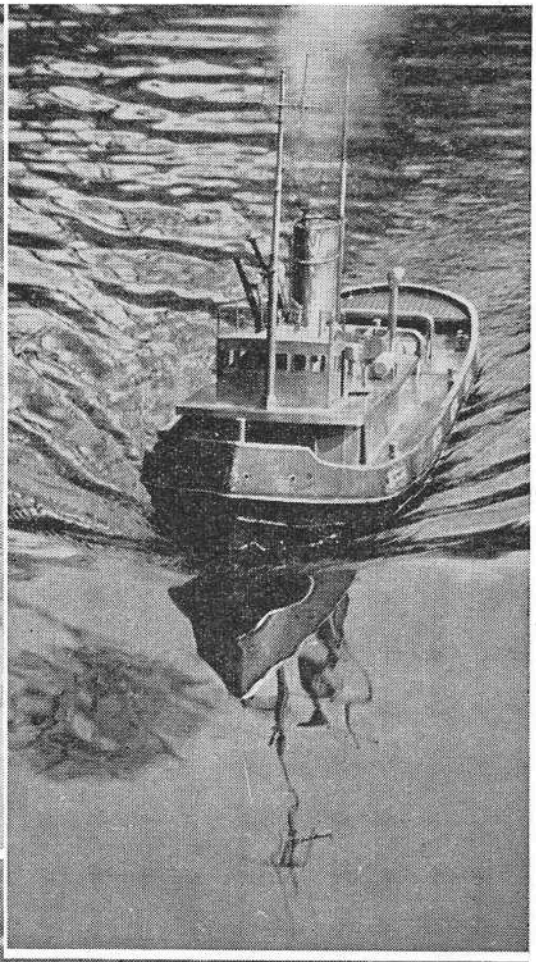
Oiling the bearings brought certain problems, as it was not easy to apply the oilcan when the superstructure was in place. Mr Kimbrey overcame this by fitting a drip-feed lubrication system which delivers oil to the three main journals.

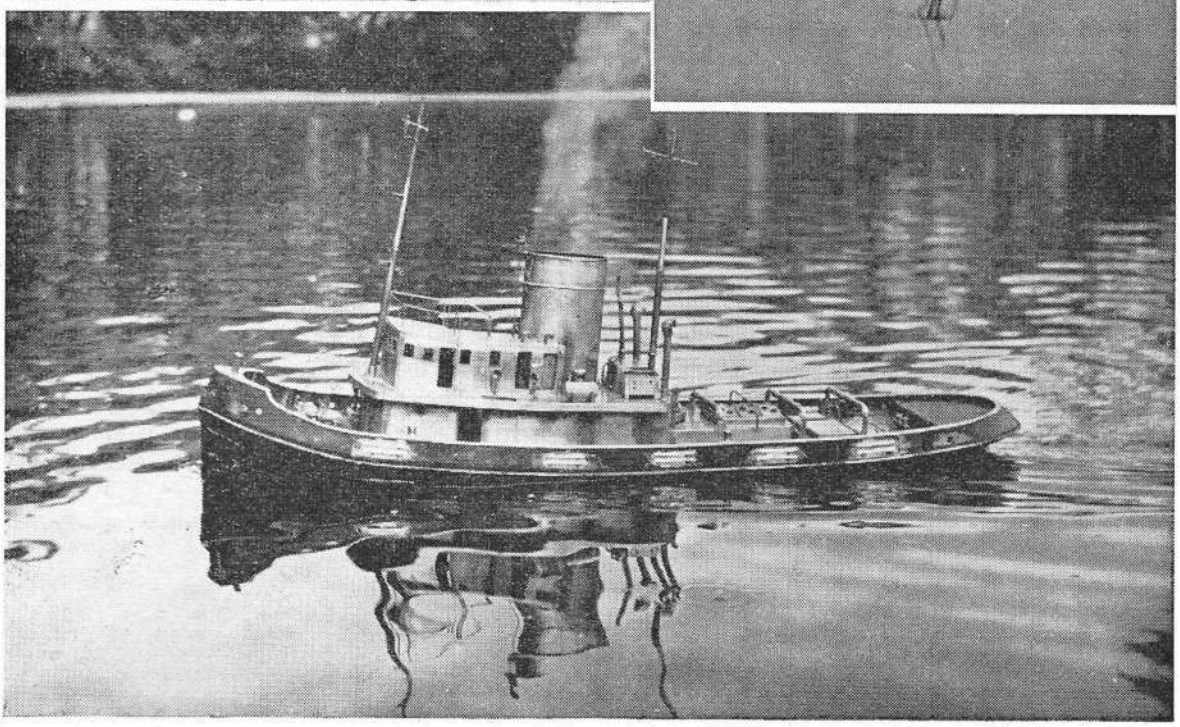
Without doubt Mr Kimbrey has produced a model which, though it is a first attempt in its class, is excellently built and extremely handsome. A great deal of her character lies in the 4,000 rivets which he painstakingly inserted. They were structurally unnecessary as the plates were efficiently soldered, but the big vessel had them, and so in they went.

One cannot help admiring the poise of the boat, and her superb steering qualities. I have not seen another model keep so straight a course.

The tug has taken two years in the making, but I am sure that the builder will get much more than two years' pleasure out of operating her.

I would not be surprised to see her bring home a few trophies to the Kimbrey household. ▣



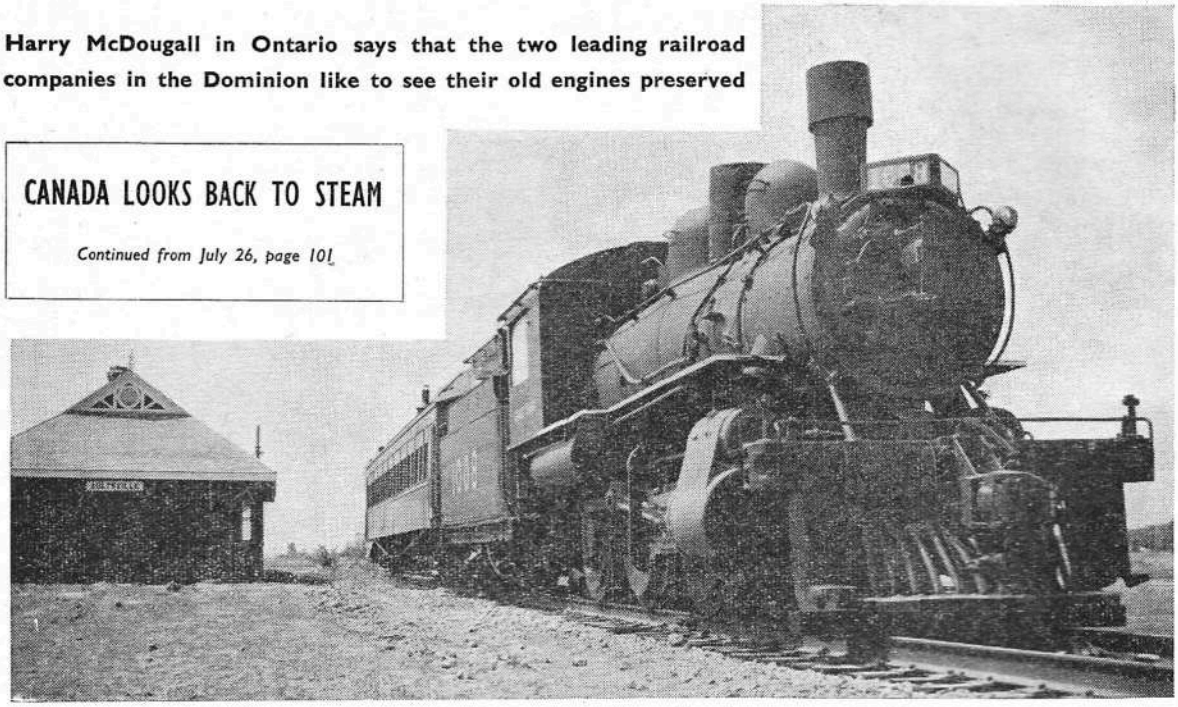


WHO WANTS A LOCOMOTIVE?

Harry McDougall in Ontario says that the two leading railroad companies in the Dominion like to see their old engines preserved

CANADA LOOKS BACK TO STEAM

Continued from July 26, page 101



Alight here for Aultsville. This old station is preserved, with No 1008 of the Grand Trunk, at St Lawrence Parks, near Iroquois, Ontario

"WANNA buy a locomotive?" The question is being asked (although perhaps not so bluntly) by both the major Canadian railroads. Nobody is more subject to fits of nostalgia than a railroader—and now that the age of steam has finally passed, the railroads would like to see as many as possible of their old steam locomotives preserved. They will sell them to anybody willing to pay the equivalent of their scrap value and "provide a good home."

A few are retained by the railroads themselves for use in hauling specials—trains chartered, as in England, by railroading enthusiasts who insist that they be hauled by a steam locomotive brought out of retirement for the day.

One such trip, run in 1960 by Canadian Pacific Railroad, attracted a great deal of attention because it was a triple-header. Steaming through the countryside, the three locomotives at the head of a long train made a memorable sight.

One passenger on that trip became so enthusiastic that he made an offer to the railroad for one of the locomotives. His offer—about equal to the value of the engine as scrap—was accepted, and CPR No 1057 now stands on a spur line beside a factory in Toronto, preserved for all to see.

No 1057 is a 4-6-0 built at the Montreal Locomotive Works in 1912. She has a tractive effort of 33,000 pounds, is a hand-fired coal-burner, and was used in passenger and freight services until she retired in April 1960.

Charles Matthews of Longstaff, Ontario, is another enthusiast who has bought a steam locomotive—a Mogul 2-6-0—and now preserves it at his own expense.

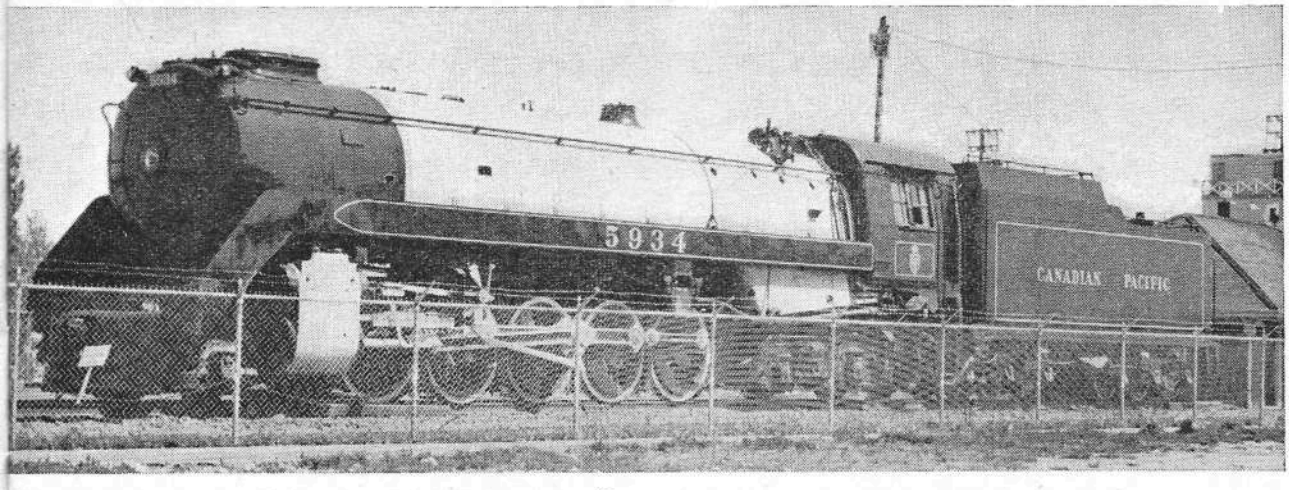
In southern Ontario, on the CNR lines near Hamilton, the Mogul is remembered with special affection. Moguls had been a familiar sight in the area for half a century. They were retained in service until well into the 1950's and were everybody's favourites. Railroad enthusiasts came hundreds of miles to see them.

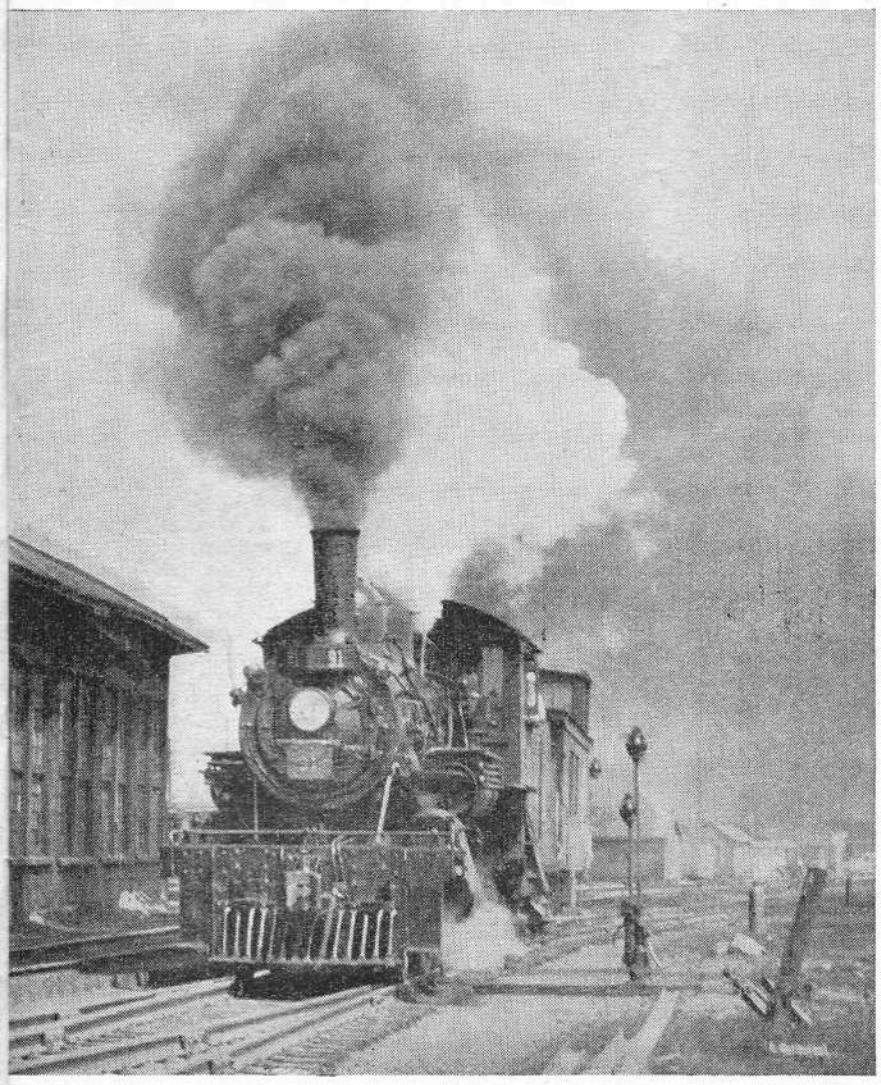
A whole fleet of Moguls operated between Hagersville and Hamilton. They were kept in service for a rather curious reason. The 200-ton giants which had superseded the Moguls in most parts of Canada, could not be employed on this line. A trestle built many years before was not strong enough to take them. If a heavy load was to be hauled, a bigger engine would be called out to help—but when the train reached the trestle, the Mogul would go happily on her way alone!

A favourite Mogul was No 88. Every day she would start off "up South" from Hamilton to Port Rowan, on to Simcoe and Port Dover, and back to Hamilton. The distance was 114 miles. At Lynn Valley spring water tumbling down from the hills was fed into a tank ready for No 88.

Port Dover, Port Rowan and Simcoe had other relics of an earlier railroad era: hand-operated turntables installed over half a century ago.

When the Moguls were originally put into service, each crew stayed with its own locomotive, developing a fondness for her and getting to know all her quirks and foibles. They took pride in polishing the bell





West of Calgary the long climb begins—but No 5934 of the Canadian Pacific now stands on display in Mewata Park. Below: The old days indeed! No 91, a Mogul, has been preserved by Charles Matthews whose home is at Longstaff, Ontario

and brasswork. Nowadays there is little left of such affection between crews and locomotives. They switch from one to another, and no longer regard any one as their personal property.

Most of the Moguls have now been broken up for scrap, but No 88 survived.

Canada in the last few years has become increasingly conscious of its own history and traditions. There is now a great deal of interest in preserving and reconstructing old buildings and even entire villages. What better adjunct to such tourist attraction than a steam locomotive!

One reconstructed area, Upper Canada Village, lies on the shores of the St Lawrence Seaway. A railway museum may be established near the main entrance, where a short section of railroad track was left in place when the main line was torn up.

As the remaining length of track was part of the old Grand Trunk railroad, it could best be occupied by a Grand Trunk engine. The records showed that No 88 had begun on the Grand Trunk Railway as No 1008. Her old number was restored and she was installed in position, together with an old CNR wooden coach, No 3474.

The former Aultsville station, a typical early wooden structure, was also moved to this site. It may

This Mogul was presented to London, Ontario, by the London and Port Stanley Railway

eventually house the railroad museum.

CNR No 81, another Mogul, is preserved in a park at Palmerston, Ontario. She was neglected for several years until Walter Nye, a retired railroader who had worked for the CNR, took pity on her and decided to devote part of his retirement to maintaining her in good condition.

With the help of his friend Ivan Birk, he gave the locomotive a complete face-lift. The two men "kid-proofed" her. They welded up the water tank cover and the boiler fire-doors so that no child could get trapped inside, and they also welded the wheels firmly to the rails in case somebody should get the idea of moving her!

They substituted plastic for glass wherever possible, and brightened the old locomotive by adding aluminium wheel-rims and other fittings that would not rust. Much to the relief of the local mothers, they cleaned out of the tender the residue of coal which had blackened a great many children in the neighbourhood.

While the railroads like to get a price at least equal to the value of the locomotive as scrap metal, they sometimes give an engine away. A Mogul was presented to London, Ontario, by the London and Port Stanley Railway.

One practical reason why the Mogul is a particular favourite is that it is relatively easy to transport. But huge transcontinental locomotives, such as CPR No 5934 on display at Mewata Park, Calgary, are the true representative of the last days of steam.

Canadian railroads continue to be very co-operative in providing locomotives to municipalities to be put on display, but they are now very careful to deal only with responsible parties because a locomotive can become a liability. An engine put on view in the United States was described as an "attractive nuisance" when she was discovered to be a potential source of injury to children playing in the park. Bids for sale and removal of the engine were made when the Chesapeake and Ohio Railway would not take her back.

The New York Central has turned down requests for locomotives for the same reasons.

Canadian railroads have avoided controversy by making certain stipulations before they hand over any locomotive. The CNR, for instance, requires the municipality to guarantee a suitable site for the engine, provide a substantial base, maintain the equipment, and pay the cost of transportation from the storage site. The cost of the entire operation can be anything from $1,000 upwards—a sum which may almost equal the purchase price of the locomotive.

One engine that is not for sale, and probably never will be, is No 6167—perhaps the favourite Canadian steam locomotive. She is a Northern, a sister engine to the one on exhibition at the Canadian National Exhibition, and is always kept in working trim.

Every year she gets up steam to haul chartered trains. In one year alone she has made as many as 17 runs between April and October, before retiring for the winter to a yard near Toronto.

★ *To be continued on August* 23

Using a test indicator (2)

By Geometer

IN mechanical engineering all components and machines have a basis of geometry which settles the shape and alignment of surfaces. For the most part it is elementary geometry visible and tangible, consisting of plane surfaces, diameters and right-angles, all of which can be proved in straightforward ways with a test indicator.

But in proving visible features you often prove those that are invisible—except on drawings, where they form the framework as axes and centre-lines. To ensure accuracy in draughting, axes and centre-lines are put in first on drawings. Then you design components, in the flat, around them. When you test three-dimensional components, you prove the basic geometry.

Take as an example a connecting rod on which the axes of big-end and small-end are parallel. On a drawing, they are two parallel lines. In testing the connecting rod, you put a well-fitting mandrel in each bearing and support the connecting rod on a surface plate. Both ends of a mandrel should then give the same reading on a test indicator, when the connecting rod is lying horizontally, and when it is standing vertically. If there is an end-to-end difference in the height of a mandrel, it is shown by a variation in the reading on the test indicator, and you know that the axes are not parallel. (You forcibly true a mal-aligned connecting rod through a corrective twist or by applying pressure opposite the bend.)

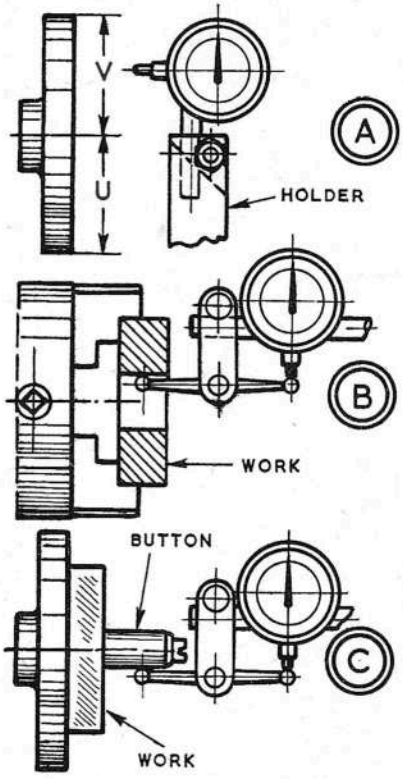
Geometry offers us many opportunities for halving errors in seeking accuracy, and for doubling the amplitude of errors the better to find small ones. An example on the drawing board is the way that you check a celluloid square. Holding it to the edge of the T-square, you pencil a vertical line. Then you turn the square over—and any error is doubled. It is the same when you test a steel square by scribing lines on a straight-edged metal plate.

By a similar principle, the flatness of a lathe faceplate can be verified and the alignment of the cross-slide checked, with a test indicator used in a holder on the topslide, as at *A*. Turn the faceplate to discover wobble and then locate the run-out vertically. Using the cross-slide, run the test indicator across the near half of the faceplate *U*. With a long holder, repeat the test on the remote half *V*.

If the faceplate has been machined on the lathe, an error is concurrent between the faceplate and the cross-slide for the near half *U*. And so the first test reveals nothing unusual. But on the remote half *V*, an error runs counter to the one on the cross-slide. The second test shows this clearly.

A universal attachment, or a lever attachment, equips a test indicator for use in bores and on outside diameters where clamps obstruct direct access. Examples of use are at *B* and *C* (clamps omitted).

When work is held in a chuck *B*, its face as well as its bore must be true. Place packing at low jaws; and for tapping the face of work, use a lead or hide hammer. If a faceplate wobbles, pack at the low point with paper. To true a button *C*, tap the edge of work with a brass or aluminium punch—the clamps can set a vertical slide to any angle just gripping. Then tighten them firmly.



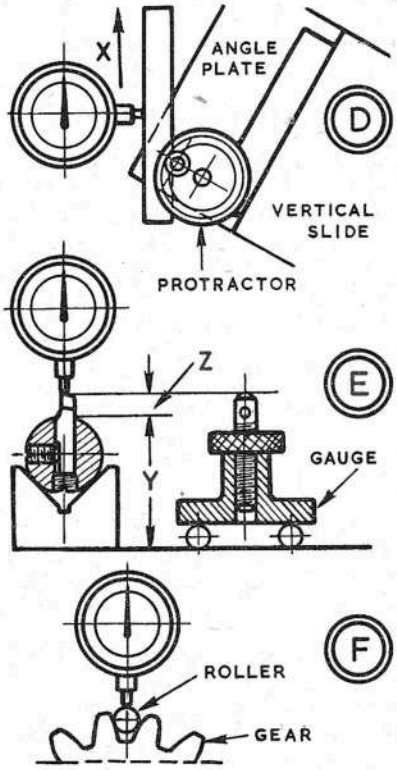
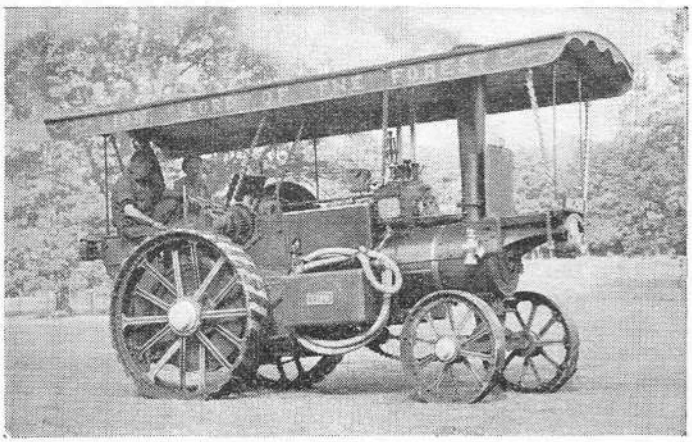


Diagram *D* illustrates how you for a milling operation. The test indicator is mounted in a chuck or on a driving plate for its plunger to bear on the blade of a protractor. You can set a vernier protractor to a fraction of a degree, and place the stock to the vertical slide with the blade across the lathe axis. To hold the protractor level, clamp it to an angle plate. Set the vertical slide so that the test indicator shows a steady reading by cross-slide movement *X*.

Two more typical uses of a test indicator are shown at *E* and *F*. To set a fly cutter, test over the bar for height *Y* and add the projection of the tool *Z*. Set a home-made height gauge to *Y*, and for *Z* place two turned rollers under the gauge. To test concentricity of the pitch circle of a gear put a roller in each tooth-space in turn, and rotate the gear under a test indicator. ▣

STEAM IN A SUSSEX PARK

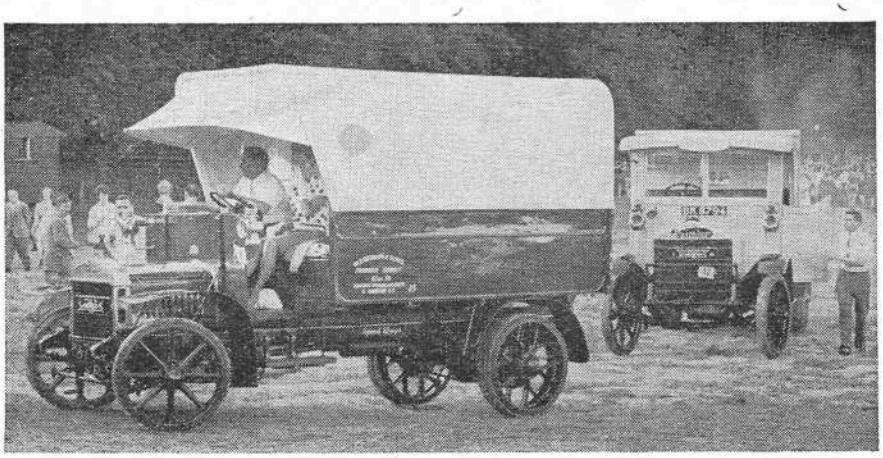
BARRY J. FINCH photographs some of the upstanding engines which rolled grandly into town during Horsham Festival Week



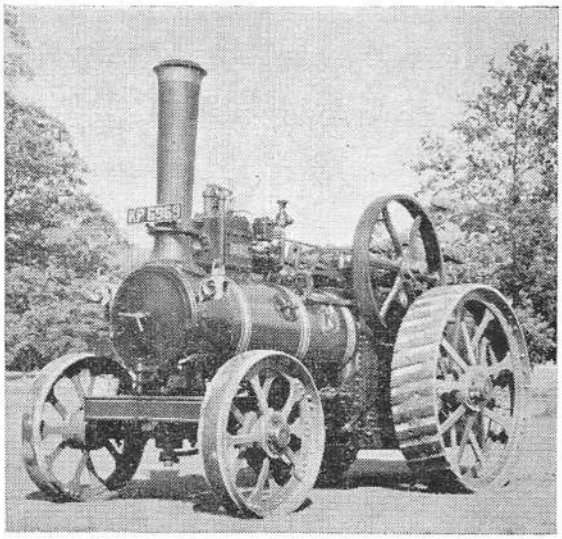
Opposite page, top: No 84562, *a Marshall* 6 *h.p. unit of* 1929 *was the second-best turned-out engine there. She won a pewter tankard for Mr D. Harding of Edenbridge*

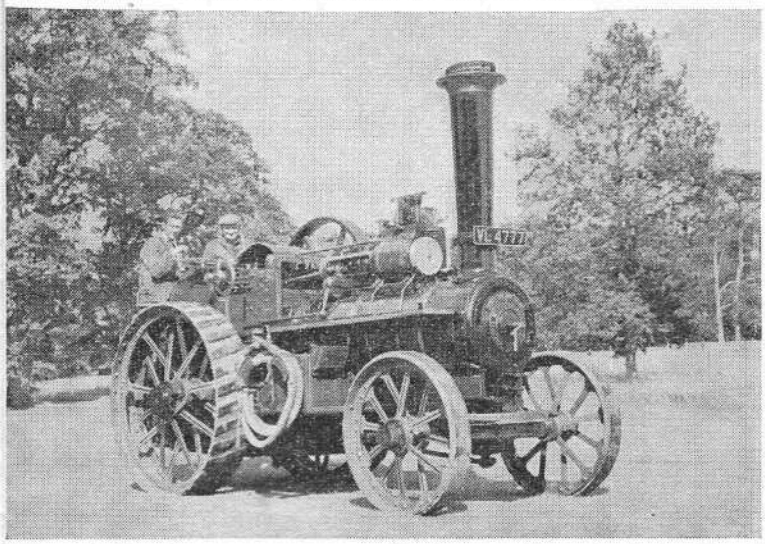
Centre, left: THE LITTLE GEM, *a Foster of* 1933, *was the best turned-out engine. J. O. Lugg and Son bought her dismantled in* '54

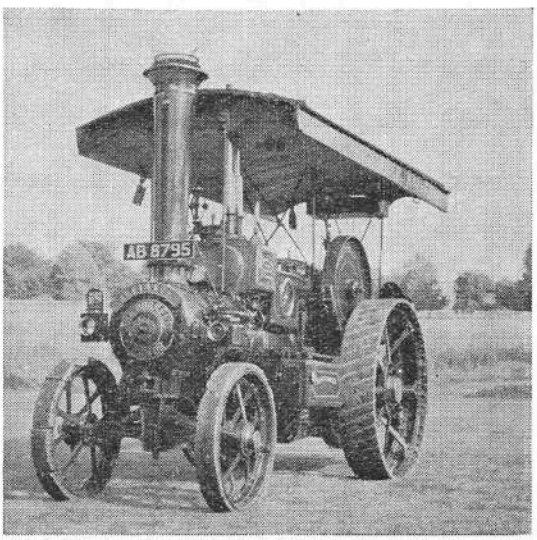
Right: Burrell No 3458 *is a* 1913 4 *n.h.p. Gold Medal tractor acquired in* 1956 *by Shipman and Barker. Bottom, left: Foden* 13716 *was in a sad state before Mr W. W. Hampshire of Ryde set to work on her in association with J. O. Lugg and Son. Right:* 3387, *an Aveling and Porter* 8 *h.p. made for Lord Tweedsmouth in* 1894, *is owned by Mr S. Hubbuck who lives at Petersfield*

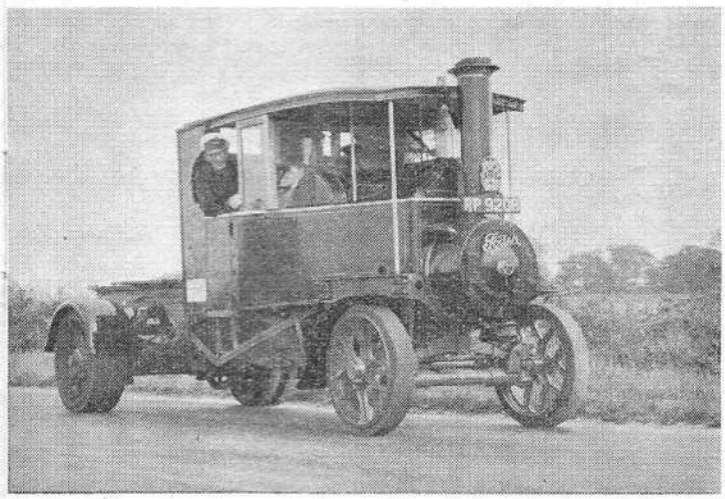


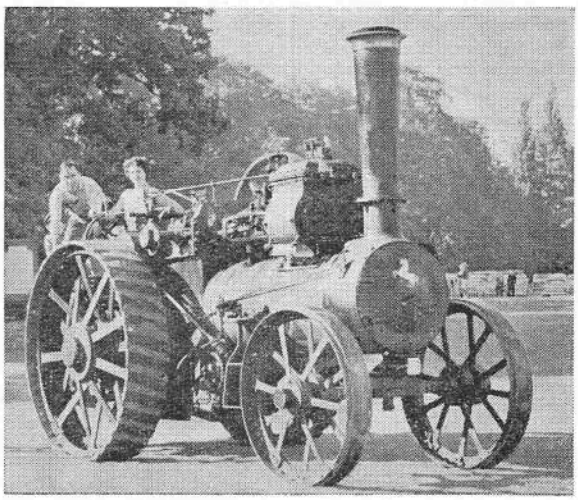
Left, above: Burrell 3718, *an engine of* 5 *h.p. and* 8 *tons, was built in* 1916 *for an engineering firm at Enfield. She was later bought by C. A. Paxton and Son, haulage contractor, Portslade. Left: This Daimler dropside truck was supplied in* 1923 *to market gardeners at Porchester by J. H. Sparshatt and Sons. To left is a Vulcan van of* 1916 *owned by Sparshatts*

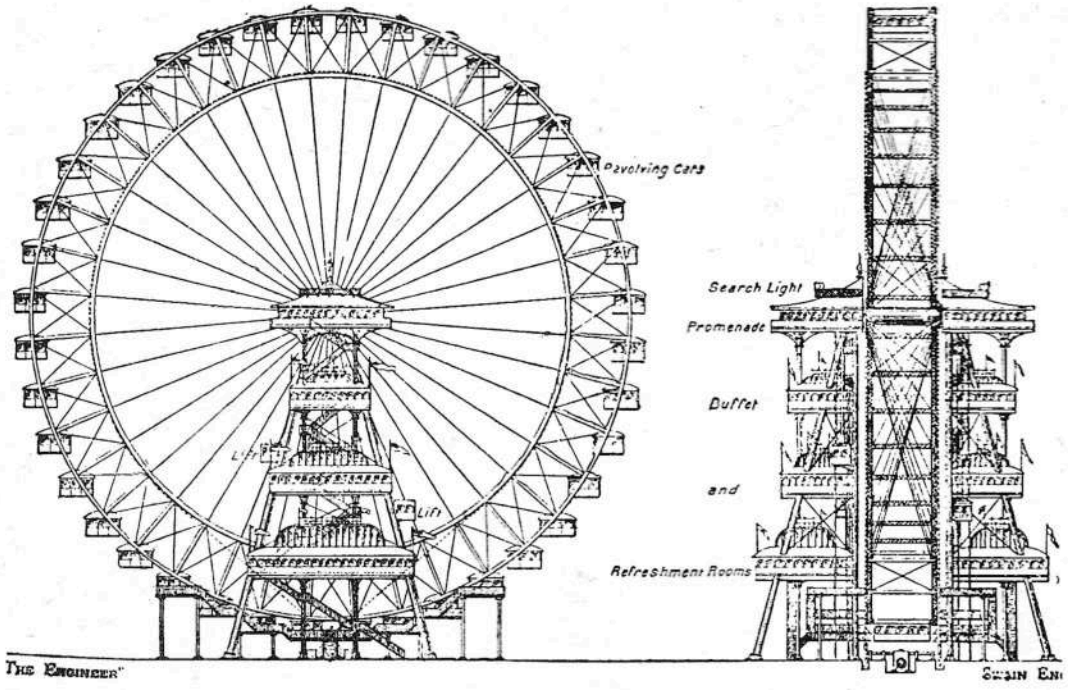












GREAT WHEEL

What happened to the gigantic structure which carried 1,600 at a time in 1894?

IMPRESSIVE though the big wheel of the modern fairground may be, it is still quite a small wheel compared with the enormous thing which turned at the Earls Court Oriental Exhibition of 1894.

The wheel was designed by W. B. Bassett, assisted by J. J. Webster, who was connected with the famous firm of Maudsley, Sons and Field. It departed from the drawing seen here in that the platform for the refreshment room is not shown in a contemporary photograph. Only the promenade deck seems to have been built; it was not as palatial as the drawing suggests.

It was 300 ft in diameter and supported by two 175 ft towers, each built of four steel plate columns 4 ft square stiffened by internal diaphragms.

In addition to the axle bearings, each tower carried a balcony reached by elevators operated by water. Communication between the balconies was through the axle, a tube 7 ft in diameter and 35 ft long. The axle, which had been made by Maudsley and Field, was a riveted steel-plated tube 1 in. thick. It weighed 58 tons. The spoke rods were attached to the hub by 3 in. pins.

All the other metalwork was produced at the Arrol Works, Glasgow, and the carriages were supplied by Brown, Marshall and Company of Birmingham.

The turning mechanism used two long chains (shown by a dotted line) running round the periphery of the wheel on each side. Each of them passed over drums in the engine-house, and then over jockey pulleys, before they returned to the drums, which were turned by two 50 h.p. Robey steam engines, one on each side. Robey's are still in business at Lincoln.

There were 40 carriages, 25 ft long × 9 ft wide × 10 ft high, and capable of accommodating 40 passengers. When they were fully loaded, 1,600 people were carried.

The passengers entered the carriages from eight platforms at different heights. All eight could be filled at one stopping. The wheel was moved to take aboard a similar number—and so on, until the full complement was aboard.

First-class accommodation cost two shillings and second-class accommodation one shilling. Each class provided for the same number, and one revolution brought in £120.

The gigantic wheel was formally commissioned on 11 July 1895. I wonder what became of it?

A. W. NEAL.

MODEL POWER BOATS AT HOVE

Southern championships

CLASS A
1. A. Washington South London 1 min. 25 sec.
2. G. Southwell Victoria 2 min. 27 sec.

CLASS B
1. J. D. Taplin Birchington 1 min. 4.4 sec.
2. A. Greenfield South London 1 min. 11 sec.
3. H. J. Taplin Birchington 1 min. 25 sec.
4. P. Painton Southampton 1 min. 27.4 sec.

CLASS C
1. G. Southwell Victoria 1 min. 10.6 sec.
2. R. Lewis Brighton 1 min. 38.8 sec.
3. J. D. Taplin Birchington 1 min. 42 sec.
4. J. F. Till Portsmouth 2 min. 14 sec.

CLASS D
1. J. D. Taplin Birchington 1 min. 40.8 sec.
2. G. Southwell Victoria 1 min. 41.5 sec.
3. P. F. Harper Victoria 1 min. 47 sec.
4. F. Body Portsmouth 1 min. 57 sec.

Fastest overall time and winner of the R.E.P. Trophy; J. D. Taplin 1 min. 4.4 sec.

All the above are invited to take part in the National Championships to be held at Witton Lakes on Sunday, September 23. There will also be a meeting at Witton Lakes on Saturday, September 22. Further details will be supplied with the starting list after the holding of the Northern Championships on August 19.

Continued from 26 July, page 118

By Edgar T. WESTBURY

WALLABY

O.H.V. TWIN

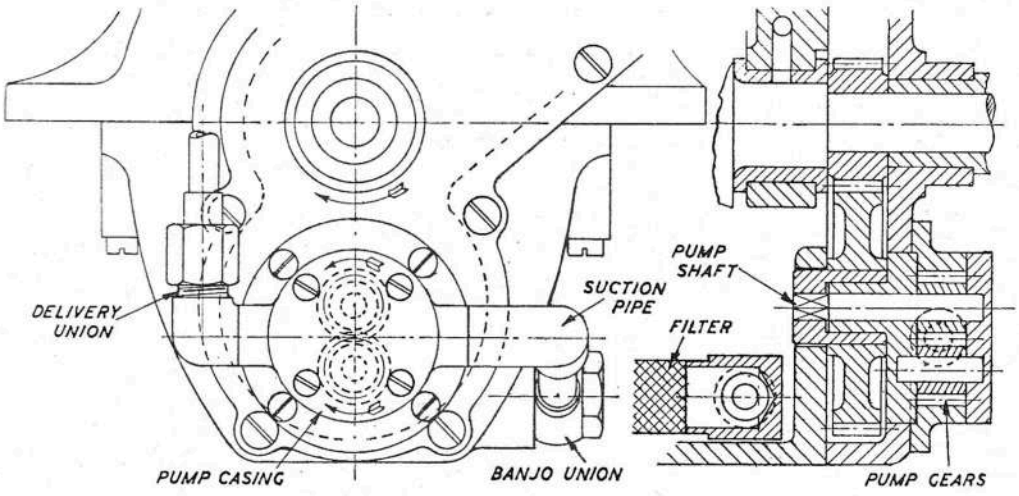
Gearwheel pump for the oil

EFFICIENT lubrication is of primary importance in all high-speed machinery, and internal combustion engines in particular. As I have already explained, a mechanical oil pump is a desirable, though not absolutely necessary, means to this end. It assures continuous and adequate supplies of oil to the main and big end bearings, which are the most heavily loaded. After passing through them, the oil is distributed by splash, or by being partly suspended in air, to all other working parts. Other methods of lubrication are permissible, but are not entirely automatic, and are thus less suited to long periods of running without constant supervision.

The oil pump used on the *Wallaby* is of the gearwheel type, which is perhaps the most popular of all for i.c. engines. It is of simple, robust construction, but calls for fairly high precision in the machining of the working parts; though these operations are by no means difficult if sound methods are observed. The pump is kept well lubricated itself, and because of the viscosity of the oil, leakage or "slip" through working clearance in the gears is not liable to be serious. Gearwheel pumps are not self-priming, and it is therefore necessary to fit them at a low level, so that they will at all times be submerged in oil and ready to deliver it immediately they are set in motion. These pumps should never be regulated by throttling either the inlet or the delivery; if excess oil is delivered, control may be obtained by a by-pass or relief valve.

The pinions for the pump on the original engine had to be specially cut, but you can now get pinion wire of high accuracy in the required size. While pump gears, strictly speaking, should have a special tooth form, with minimum tip and root clearance, ordinary small involute gears work quite well. In the assembly drawing the gears are shown as made separate, and pressed on shafts of silver steel, but it is almost as easy to make them integral with the shafts. In either instance, they must be chucked truly for boring or turning operations. The simplest way to do this is to make a chucking bush, bored in position to take the pinion wire a light press fit over the teeth. It may then be faced, bored and parted off, or accurately centre-drilled, so that when it is extended further from the bush it can be supported by the back centre for turning the shafts. Both ends of these can be turned at one setting before the pinions are parted in a finished form.

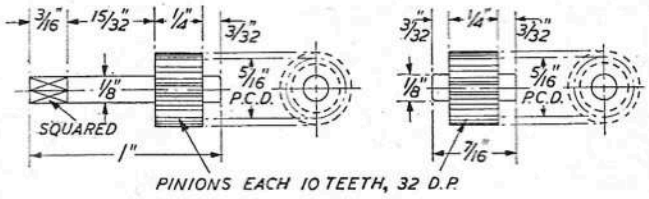
The pump is made in three main parts for simplicity in machining. Though you can reduce them to two by making either the front or back cover integral with the housing the process introduces some difficulties in exact centre locations, unless machining jigs are used. Usually, with either method, you will fabricate the housing by turning it ex-



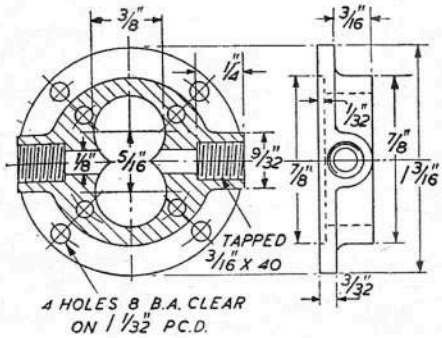
Complete oil pump assembly

ternally and silver soldering the inlet and delivery bosses in position. These may be drilled through, and spigoted for setting, but the final facing, drilling and tapping should be left till they are completed.

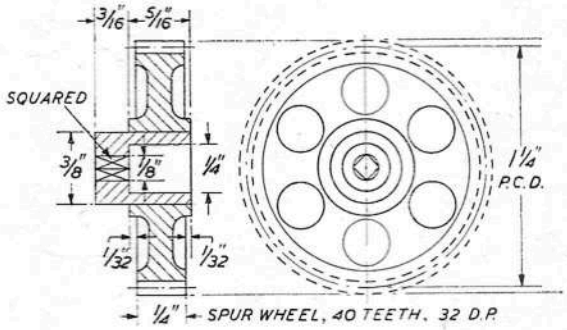
The housing is set up for machining the rear flange and the recess, and reversed for facing the front, which should be exactly parallel. It is then carefully marked out on this face for the positioning of the pinion centres. Those who are skilled in toolroom work may be capable of setting these out by dead measurement, using a vernier height gauge or toolmaker's buttons. But other and simpler methods are quite practicable. The problem of setting up to find the gear centres will arise; and the method which I recommend simplifies it, besides ensuring the exact coincidence of the centres in both the body and rear endplate.



Details of oil pump pinions



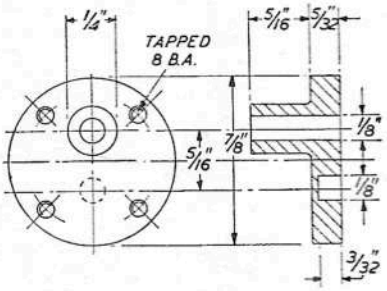
Oil pump housing



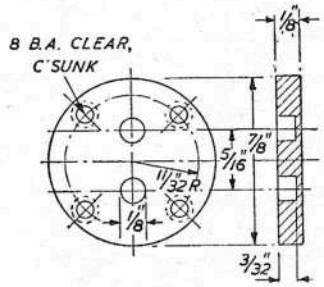
Oil pump delivery gearwheel

A piece of bar stock large enough to make the inner endplate is held in a fixture such as a Keets V-angle plate, which will allow it to be set over eccentrically, while parallel alignment is maintained. The bar should be long enough to permit of secure clamping, with the end projecting for machining. It is first faced and turned concentrically, to a close fit for the recess of the pump housing.

The holes for the fixing screws are now drilled in the housing. Holes to coincide with them are drilled and tapped in the bar so that the housing can be secured by temporary screws. Take care to eliminate burrs, so that it seats truly, and interpose a disc of paper between the two parts. The fixture is set over to establish the centre for the lower (non-driving) pinion, and the housing is carefully centre-drilled, and drilled No 31 right through into the bar deep enough to form the pinion shaft bearing. It may then be opened out *through the body only* to $\frac{3}{8}$ in. dia. so that the pinion wire will fit with the barest possible clearance. The paper insert will serve as a "witness" for accurate depth. If the recess should be too deep, so as to enter the face of the bar, you can machine the bar back after all the other operations are completed. A $\frac{1}{8}$ in. D-bit can be used to finish the flat-ended bore for the pinion bearings to a depth of $\frac{3}{32}$ in.



Inner endplate



Outer endplate

You must now fix the centre for the upper (driving) pinion, at a distance of exactly $\frac{5}{16}$ in. from the lower one. Instead of relying on marked out centres, you can accurately measure the set-over distance of the fixture by another method. First, a straight strip of metal should be clamped to the faceplate, in contact with the edge of the fixture on the side further from the centre already bored. Use some form of gauge, such as a roller or short piece of bar exactly $\frac{5}{16}$ in. dia., to measure the distance the fixture is to be shifted, after loosening, on the faceplate. It is important that the fixture should move *in a straight line* away from the locating strip, just sufficiently for the gauge to be inserted; the fixture is then again secured.

The drilling and boring operations are then repeated, but now the $\frac{1}{8}$ in. hole is continued into the bar for a distance of $\frac{1}{2}$ in. to form the extended shaft bearing. As no further work on the pump housing

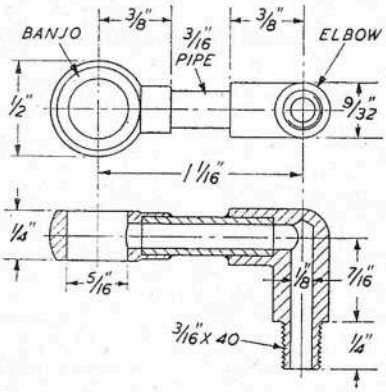
is required after you have bored it out to take the pinions—most of this work must be done with a single-point boring tool, as it breaks into the adjacent bore—you can then remove it from the piece held in the fixture. The outside of the inner cover can now be machined to form the bearing, leaving a flange $\frac{5}{32}$ in. thick, and parted off at $\frac{5}{16}$ in. further distance. The outside of the bearing must be concentric with the bore, and $\frac{1}{4}$ in. diameter to fit the sleeve of the driving gear.

The outer endplate is simply a flat disc $\frac{1}{8}$ in. thick, truly faced on the inside, and with $\frac{1}{8}$ in. blind holes to fit the pinion shafts. To set it accurately you should jig-drill the disc from the housing to take the attachment screws, and temporarily fix it in position. A jig bush, closely fitting in the pinion housings, and concentrically drilled No 31, is then used to position the pinion bearings, which in here also may be finished with a flat-ended $\frac{1}{8}$ in. D-bit.

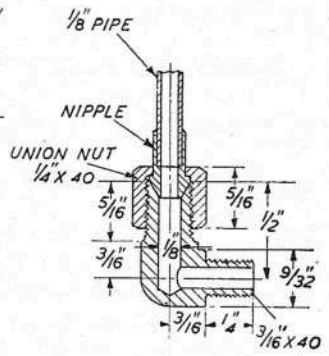
When the pump is assembled, the pinions should mesh closely together and work freely, but with no perceptible end play. You can best carry out the cross drilling, tapping and facing of the inlet and delivery bosses by mounting the housing on an angle plate; take care to remove the burrs thrown up by the drill on the **inside.**

The gearwheel which drives the pump is similar to that on the camshaft, except for the hub. If the gear has a pressed-in centre, it should be removed; otherwise it needs to be bored out truly. A steel sleeve, drilled $\frac{3}{32}$ in. and counterbored $\frac{1}{4}$ in. to fit on the outside of the pump bearing, is then made a press fit in the gear centre. Engagement with the pump shaft is by squaring out the hole to fit the similarly formed shaft end. This may be done by filing or drifting, but I prefer to use a small shaping tool, such as a small diamond-point chisel or graver, in the lathe toolpost, indexing the work in four positions.

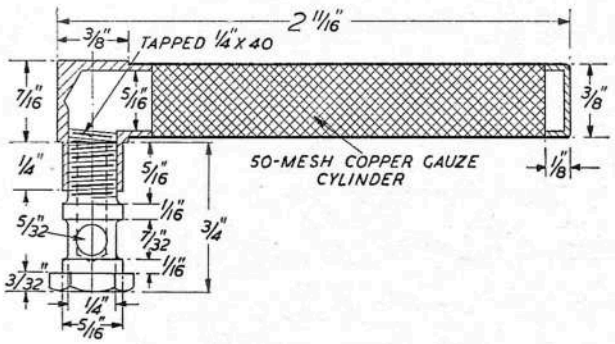
For the attachment of the oil pump to the timing case of the engine, a hole must be bored in the case at a distance of $1\frac{3}{32}$ in. from the main shaft centre. It should be set out as accurately as possible; while some latitude is permissible in the hole for the gears to be adjusted in mesh before the pump is fixed in position, it is better to avoid the need for this. You should mount the timing case on the faceplate for boring the hole. At the same setting, it should be locally faced to form a seating for the pump flange. Before the pump can be fitted, a hole must also be bored in the end face of the sump (see assembly drawing) to accommodate the end of the gear sleeve. The position of the hole may be found by removing the outer cover of the pump, clamping it in position, and using the shaft bearing as a jig to drill a pilot hole in the sump, to be opened out to $\frac{3}{8}$ in. dia. While the diameter need not be an exact running fit for the sleeve, it is the better for being so, particularly as it must hold the gear in the approximate position for reassembly if the pump is removed from the engine for any reason.



Oil inlet banjo and elbow



Delivery elbow and union



Suction oil filter

Connecting up

The oil service pipes and fittings call for very little comment, as they are straightforward to make, and are subject to several modifications. Note that, as shown in the assembly drawing, the inlet and delivery pump connections are arranged to suit a clockwise rotation of the engine at the timing end; if this is altered they must, of course, be reversed left to right. The oil delivery pipe is taken to a single connection on the centre main bearing, or to three connections feeding the individual main bearings. A spring-loaded relief valve may be fitted in the delivery line, and adjusted to spill oil back to the sump if the pressure or volume is excessive. A suction filter may be regarded as superfluous by many, as it is generally possible to ensure that the oil is clean, and to drain and renew it frequently.

An engine in which definite air displacement takes place in the crankcase (such as a single or 360-deg. twin) needs to have provision for free escape of air, preferably in the form of a light non-return valve, so that the mean crankcase pressure is maintained slightly below atmospheric. In the combined breather, oil filler and dipstick for this engine, a flexible leather or p.v.c. disc is used as the valve, but a metal or fibre disc, limited to a lift of not more than $\frac{1}{16}$ in., is also suitable. The dipstick should preferably be grooved as shown to give a positive indication of oil depth.

★ *To be continued on August 23*

ALONG THE LANES

Above: This is the engine as she is now. She belongs to Charles and Derek Rule and was described two weeks ago. Below: Here she is in a picture taken by Brian Western on an earlier visit. Robin Orchard broods alone at the rear; only two can play

RUST had attacked the front ring of the smokebox so badly that it had to be replaced. Parts of the tender were also badly rusted. It is quite common for the tender to be eaten away as the water tends to lie in it.

While the wheels were in very good condition, the spud pan was too far gone. A new one had not been fitted at the time that I was there, and nor had the smokebox door ring, proudly proclaiming that she was a Marshall. Since the varnishing she looks a picture in her excellent paintwork.

To appreciate her to the full you must go for a ride, and we went for a meander along the country lanes. Behind was a small trailer carrying extra coals and enough tools to rebuild the engine completely.

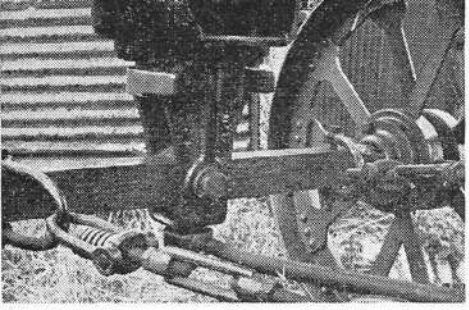
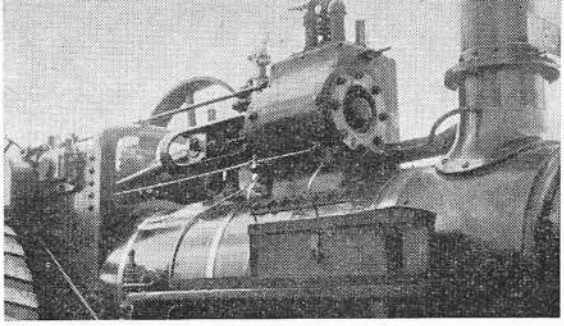
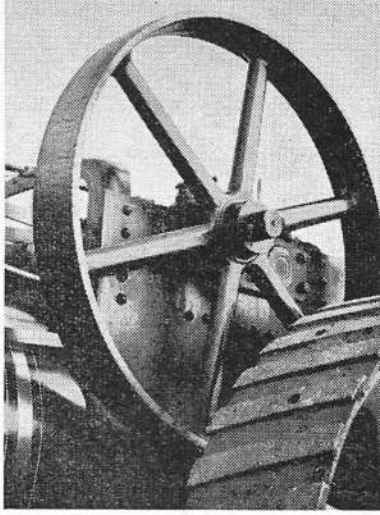
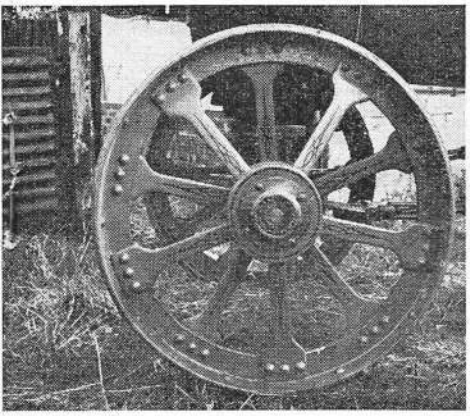
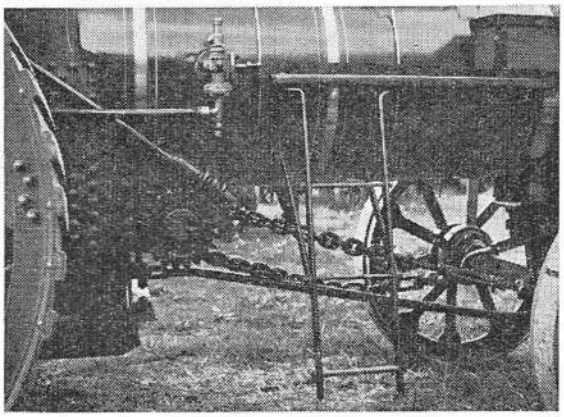
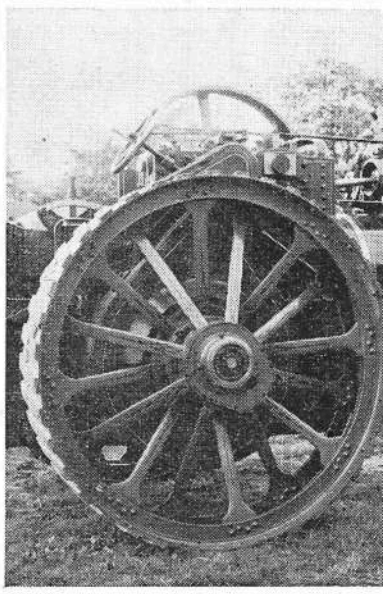
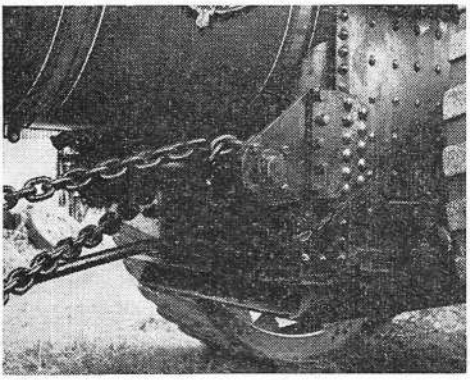
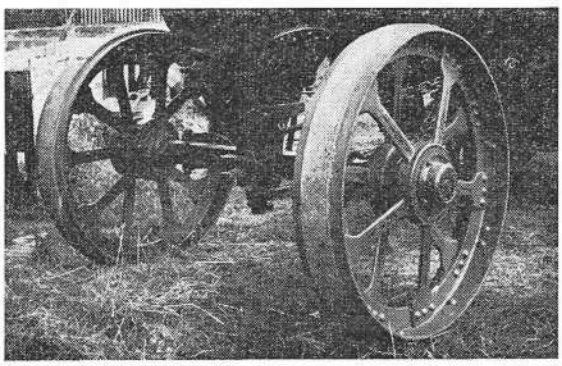
Charles and Derek had decided to take the short steep path to the road from the high ground on which she stood. Many people said that the engine would not go down without priming, but Uncle Arthur maintained that she would. He was right. Out on the road she pulled steadily along, the bark of the engine re-echoing off the houses as she strode through the village. Heads popped out of windows, school children looked enviously up from their books, housewives left the cooking to have a peep, and old men lifted their bent backs from the weeding.

We pulled in to the side of the road and left the engine to simmer quietly while we had some coffee. I suppose true dyed-in-the-wool traction engine men would have quaffed a pint or two of best draught English ale. A quarter of an hour later we were back on the road again with Brian Western steering. If you had driven down that road afterwards and looked at the tracks left behind, you would have thought Brian was drunk in charge.

It was lucky that there were not any kerb-stones along that stretch of road. Up over the railway the Marshall went, and out on to the main road with myself at the wheel. The lorry drivers, no doubt, had a few anxious moments.

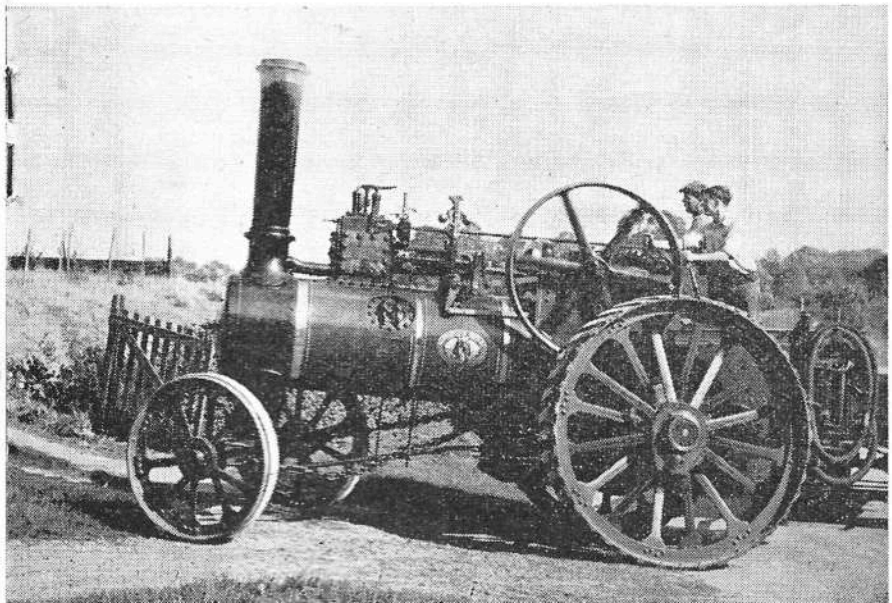
After about three miles we left the main road and made our way back to Ickleton, stopping on the way to draw water out of the stream, much to the annoyance of the swans.

Then we decided to drive round and see some of the other interesting

ROBIN ORCHARD DRIVES THE MARSHALL TRACTION ENGINE

RESCUED BY TWO YOUNG MEN AT ICKLETON, CAMBRIDGESHIRE



engines preserved in the district. First, we called on Bob Pumfrey at Duxford. Bob was selling up the family farm that day, but fortunately he will never sell his two Rustons.

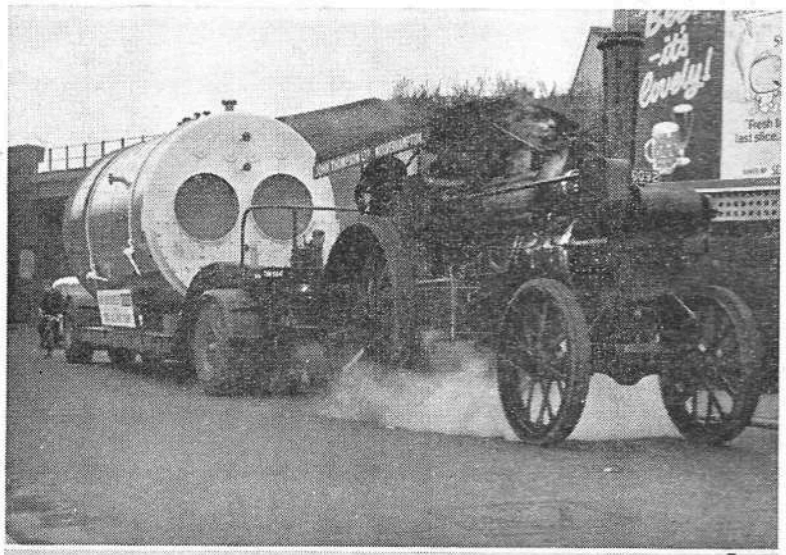
Over at Stapelford we saw an interesting Ransomes, Simms and Jeffries engine, No 18564 *Sybil*, which was being completely rebuilt by its owners, Basil and Gerald Beavis.

We finished at Great Leighs. Up a long drive we went, and then out into a clearing. On one side stood a Burrell showman's engine all sheeted up. In a shed we found a rare engine, a Fowell built at St Ives in Huntingdonshire. From under a rusty portable grinned the dirty face of Jack Shuttlewood, probably the finest traction engineer in the country. After his customary salutation of "How d'r dew borr?" in a thick Essex accent, we sat and talked of traction engines. ▣

MODEL ENGINEER

How many steam road locomotives continue to do the work for which they were built? W. J. HUGHES writes of one

STILL WITH THE SAME PEOPLE



Top: Super Lion No 17212, *still working for the same owners, after more than thirty years. Mr Frederick Apperly (in trilby hat) drove No* 17212 *out of the works in* 1929; *he is now transport manager of the company*

IN these days we rarely see a steam road locomotive doing the work for which it was designed. One which still serves its original purpose is a Fowler Super Lion belonging to Mr Eric Middleton of Hartlebury, near Stourport in Worcestershire.

Fowler Super Lion No 17212, a crane engine of 10 n.h.p., was built in 1929 for John Thompson Limited, the Wolverhampton engineers, and has remained with them until the present.

She was driven from the Fowler works at Leeds by Mr Frederick Apperley, who is now Thompson's transport manager. He seldom drives nowadays but is soon up on the footplate of any engine when he has the chance.

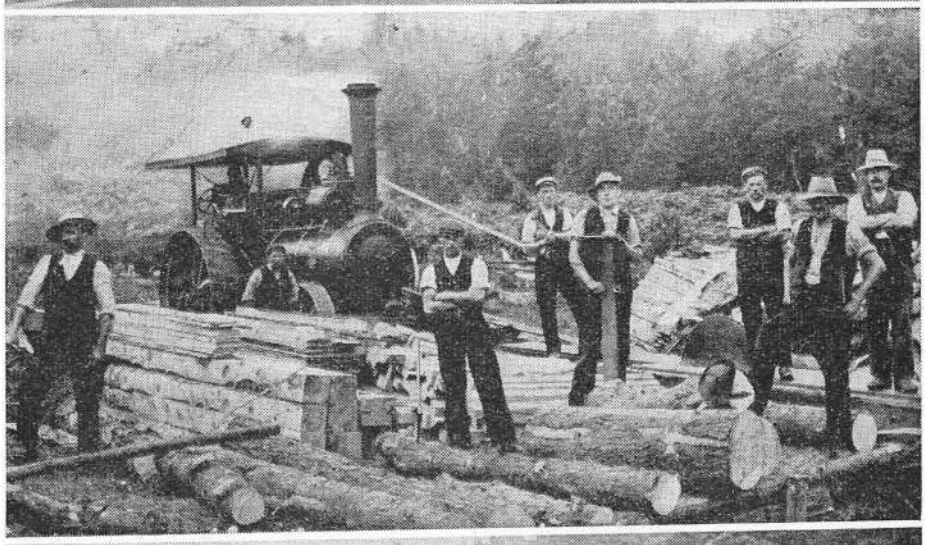
Such an occasion arose when Thompson's 10,000th boiler was sent to Rolls-Royce at Derby. In the picture the boiler is seen soon after starting its journey. Unfortunately, the Fowler is licensed only for use between the various works and the station in Wolverhampton, and so the journey which began under steam power had to be completed by diesel tractor.

My next photograph shows another Super Lion, No 17105 *Atlas*, being towed as a "dead engine" from the Wirral to a new home at Uttoxeter in Staffordshire.

G. E. ("Ted") Trubshaw, the new owner, tells me that he intends to strip the engine completely and rebuild her as nearly as possible to the original specification. This will undoubtedly be a long task, but Ted hopes that when it is complete *Atlas* will be able to travel long distances with heavy loads once more. At the time of writing the engine is fully sheeted up, while a new workshop, 37 ft × 15 ft × 15 ft, is being built to house her during her reconstruction. *Atlas* was new in July 1928.

Now for two old-time pictures,

Through Tean on the Staffordshire river, ATLAS *passes on her way to a rebuilding*



It is 1906 *and the* 8 *n.h.p. Allchin is working, with a crew of foresters, on the demesne of the Duke of Northumberland*

More forestry work for the Duke. What are the men cutting?

taken well over half a century ago. They both show the same engine, an 8 h.p. single-cylinder Allchin, new in 1905 to J. Ord of Alnwick, Northumberland. The photographs were sent to me by Mr H. Godfrey of that town, who had borrowed them from his friend Mr K. Kinghorn, also of Alnwick.

Mr Kinghorn says that the engine did nothing but sawmill work. When the photographs were taken in 1906 she was on hire to the Duke of Northumberland, helping with the estate work. The Duke had an 8 h.p. single-cylinder Fowler of his own which was engaged on similar work elsewhere on the estate. Mr Kinghorn's grandfather, Thomas, was the driver of the Fowler, which he fetched from Leeds in 1903. He had earlier had charge of the Duke's steam ploughing set. All the years of his working life were spent in steam in the Duke's service.

The Fowler was sold to a threshing contractor in 1928, and was scrapped in 1947. So far as Mr Kinghorn knows, another 8 h.p. Fowler is still at work on the Duke's estate in Middlesex.

Mr Kinghorn's father is in both the Allchin pictures—second from the right in first and extreme right in the other. Mr Ord, owner of the Allchin, had another 8 h.p. Allchin at the same period; she was used almost exclusively on threshing contracting. ▣

NO MISTING

VARIOUS articles have appeared in MODEL ENGINEER on how to prevent condensation in the workshop, but I do not think anyone has mentioned that condensation will not take place at temperatures below 45 deg. F if the relative humidity of the workshop air is kept down.

My own workshop measures 10 ft × 8 ft and is constructed of cedarwood on a 1½ in. × 2 in. deal frame, except for the roof, which is tongued and grooved deal covered with the usual roofing felt. The 4 in. concrete base is overlaid with two 4 ft × 10 ft strips of p.v.c. floor covering and the join is sealed with Sylglass tape.

I thought of putting a damp-proof course in the concrete, but decided that I should still need some kind of floor covering. Vinyl provides an ideal covering which is also completely proof against water vapour. I chose a pattern with a white reverse side and laid it white side up. Anyone who has tried looking for very small screws on the workshop floor will appreciate the reason.

It is, of course, important that the wooden base of the shed should stand on the vinyl covering, and that the planks forming the walls should overlap both these and the concrete base by ½ in. to ¾ in. to prevent rain seepage.

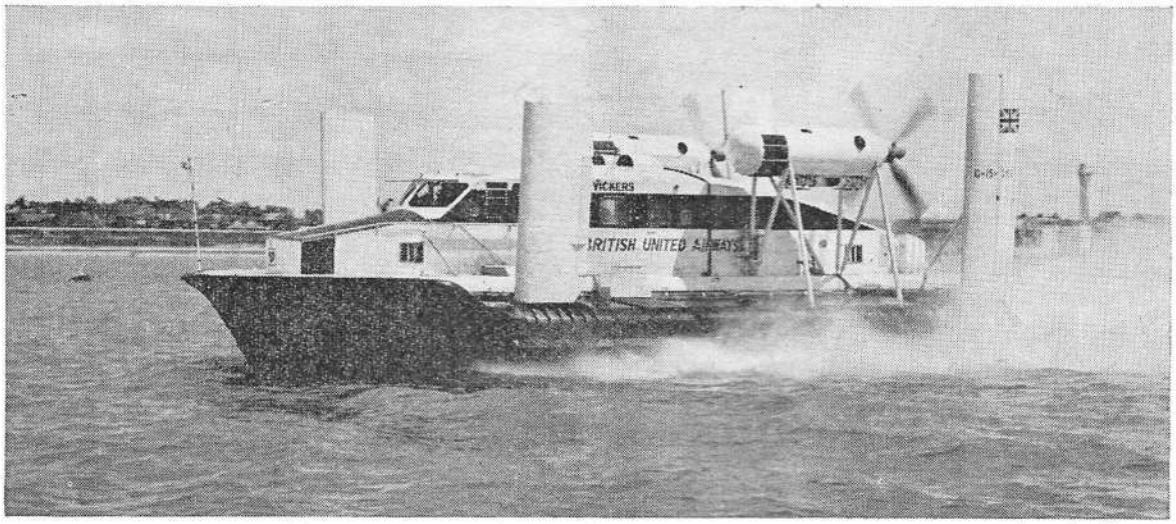
To conserve heat, I nailed ¼ in. softboard to the framework and roof timbers to form a lining. Without attempting anything in the way of sealed units, I double-glazed the windows. The inside panes were held in position with brads.

I have had no trouble with misting. In the winter the workshop is kept dry and warm by a 250 w. electric cupboard heater. These temperatures were recorded on days when the heater was not used:

Outside	Inside
31	45 deg. F
38	56 „ „
54	64 „ „
48	60 „ „
44	54 „ „

On an evening when the outside temperature was well below freezing, I shut off the heater. The following morning the inside temperature read 33 deg. A 2,000 w. convection heater was switched on, and the temperature rose to 65 in two hours; at no time was there any sign of misting on the polished parts of my machinery, which included a Boxford shaper and a Myford lathe. There must have been a ton of metal at about freezing point when the heater was switched on, and there was no sign of condensation on any of it!

F. A. MERRY.



AIR CUSHION OVER DEE ESTUARY

The first hovercraft in the world to go into regular passenger service is the Vickers VA3, here seen at speed, its stern hidden in a curtain of flying spray. Reports from travellers and crew all spoke of the excellent riding qualities of the craft during its preliminary runs across the estuary of the Dee

Around the TRADE

Clarkson's castings

H. CLARKSON AND SON of York, who for many years have carried on a professional model engineering business, have just opened a foundry for the supply of castings. This is good news, for there are not many who supply castings for model engineers and a new name in the field is welcome.

Clarkson will be marketing non-ferrous and crucible cast-iron products. Among the sets which they will have for sale will be castings for the LNER B1, B2, A3 and L1 in 3½ in. gauge, the 10-coupled Austerity in 5 in. gauge, and the A3 in 5 in. gauge.

The address of H. Clarkson and Son is 53-57 Layerthorpe, York.

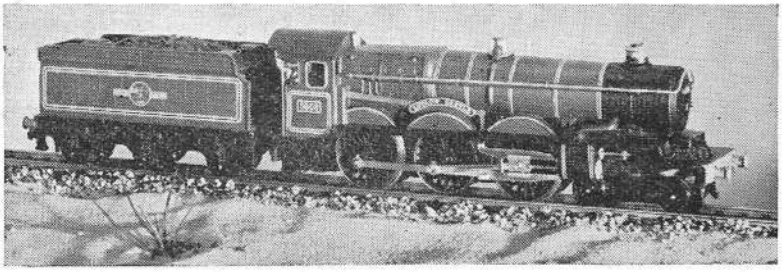
Price down!

STANLEY-BRIDGES LIMITED have cut the price of their well-known DR2T Neonic home workshop drill. It now costs £6 19s. 6d.—nearly 17 per cent less than before.

The new price has been made possible by the increased power-tool production facilities earlier this year when Stanley Works (GB) Limited and S. N. Bridges and Co. Ltd. linked to form the largest tool producing group in the world.

The Bridges is the only home workshop power drill which has the Neonic Safety Eye, which ensures that the tool is correctly connected to the mains and earthed; a cartridge motor, the most powerful on any home workshop drill; and ball bearings throughout. It also has GPO-approved built-in radio and TV suppression.

At present, the new retail price of the DR2T Neonic drill applies only in the United Kingdom.



Ludlow Castle

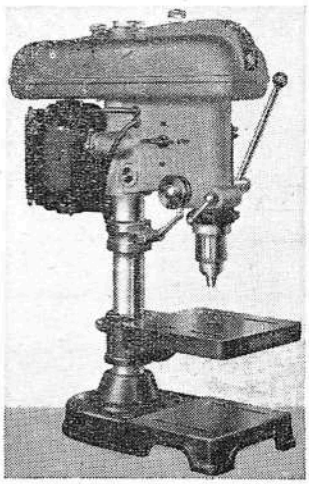
FITTED with the ring field motor the new Hornby-Dublo 4-6-0 *Ludlow Castle* locomotive and tender model of a Western Region Castle Class locomotive is similar to the *Cardiff Castle* but is designed for use on three-rail layouts.

It costs £4 5s. 2d.

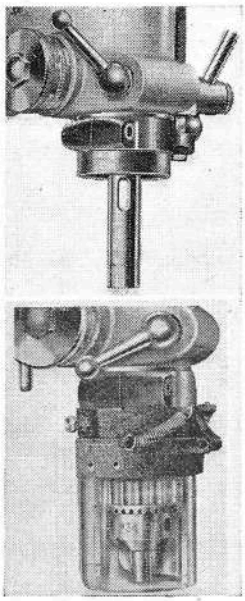
Variations on a Fobco

A FOBCO drill has been giving satisfactory service in the ME workshop for about three years.

Eight variations of this drill are now marketed by the Acorn Machine Tool Co. Ltd, of 610 Chiswick High Road, London W4.



The choice ranges through bench and pedestal models and gives alternatives of single- or three-phase motors, and No 1 Morse taper spindle or Jacobs chuck. The prices range from £43 15s. to £47 7s. 6d.



No 1 Morse taper may be had instead of the standard spindle. A plastic chuck guard, hinged, spring-loaded, and easily removed is added by many Fobco users

New sales centre

WOLF ELECTRIC TOOLS LIMITED announce the opening at Stanlake Road, Shepherds Bush, W12, of a London and Home Counties Sales and Service Centre.

This will provide an even higher standard of service for the many thousands of Wolf users in this intensively industrialised and densely populated part of Britain. Wolf distributors and stockists throughout the area will greatly benefit.

The new centre is under the management of Mr P. Frost, who was manager of the Wolf Branch in Birmingham. He is assisted by Mr W. J. Beesley, service supervisor. Hours of business are 9 a.m.-5.15 p.m. from Monday to Friday. There are good car parking facilities for customers wishing to collect urgent orders.

Customers within the London and Home Counties areas are requested to deal direct with the new centre on all sales and service matters.

WHEN YOUTH SETS SAIL

If success attends the appeal for funds made by the Sail Training Association with the support of Prince Philip, Britain will send about five hundred boys to sea every year in a modern topsail schooner

WHEN Prince Philip launched an appeal, at a recent Mansion House luncheon, for £300,000 to build a topsail schooner, Britain was made aware of the great ambition of the Sail Training Association.

Since this fine body was founded seven years ago through the zeal of Mr Bernard Morgan, it has done a tremendous amount to sustain public interest in sail.

The dramatic sailing ship races which it organised—Torbay to Lisbon in 1956; Corunna to the Canaries in 1958; Oslo to Ostend in 1960—have given enormous encouragement to those who believe, in company with great men like the Poet Laureate, that nothing can equal a training in sail.

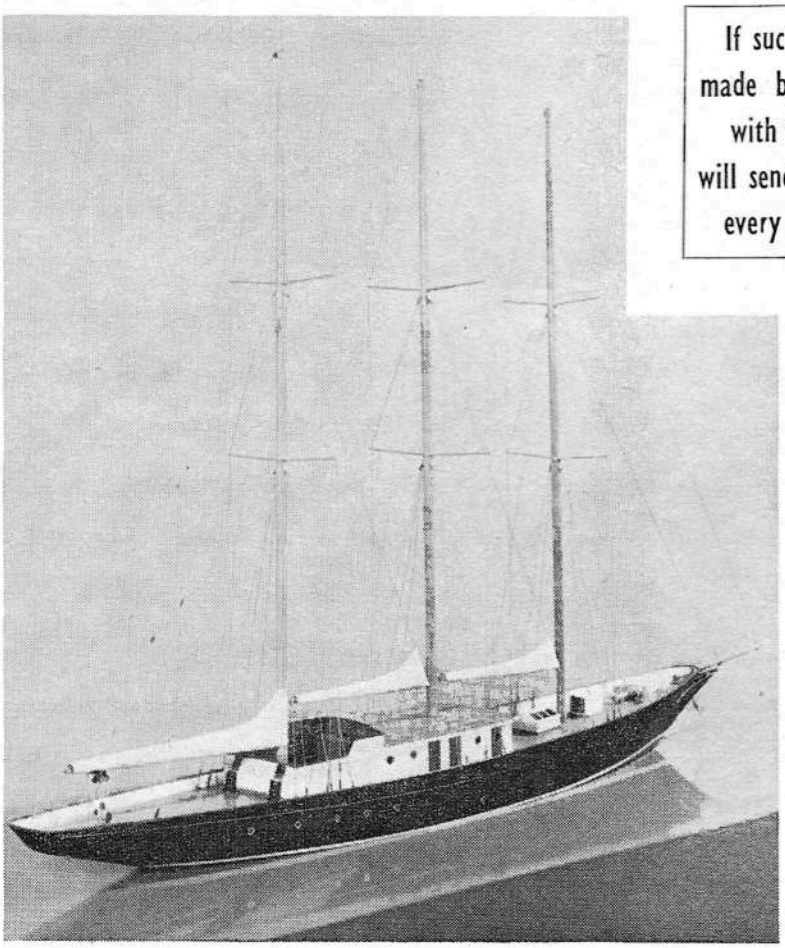
But the country which built *Cutty Sark* and *Thermopylae*, and other fine ships like them, has no national sailing vessel to provide a healthy means of character training for its youth. It was the need for such a vessel which the Prince emphasised in his address.

The topsail schooner which the STA hopes to build from the funds to be raised will remedy this lack and give Britain parity with several other countries.

Not only is this news encouraging to men who know the value of an early training in a challenging and adventurous life; it is also thrilling reading for ship modellers. Here is a modern sailing ship to which they can devote their modelling skill.

For the technically-minded here are the details of the proposed schooner:

Her principal dimensions are length overall 135 ft, length waterline 100 ft, beam 25 ft, and maximum draft 14 ft 6in., with a displacement of about 235 tons. She is an all-steel ship with $\frac{1}{4}$ in. thick shell-plating on $4\frac{1}{2}$ in. × 3 in. angle frames. The main deck is either of steel or teak. The lower deck is all steel forward of the engine room, and of pine on steel beams aft.



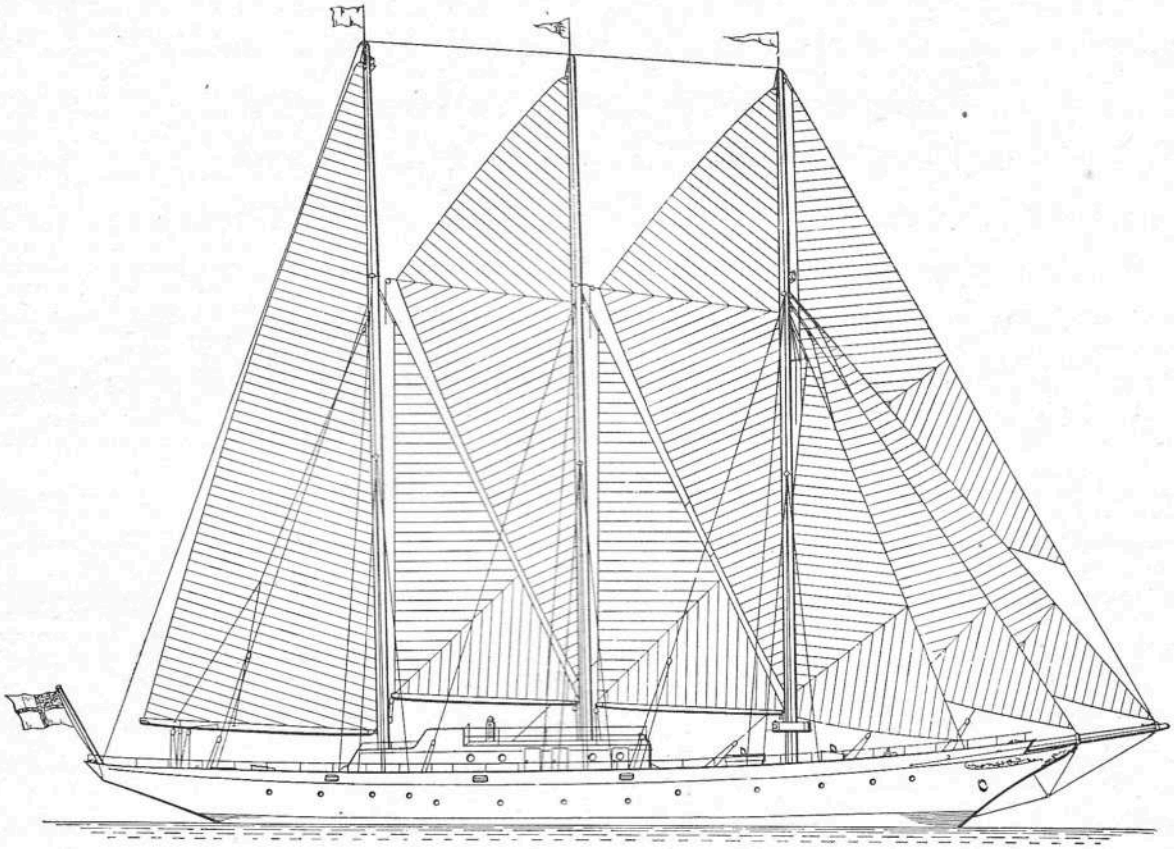
Four watertight bulkheads are to be fitted: at the aft peak, fore peak and at either end of the engine room. The complete deckhouse structure is also to be of steel. The ballast keel consists of 60 tons of lead run inside the hull plating after it is completed.

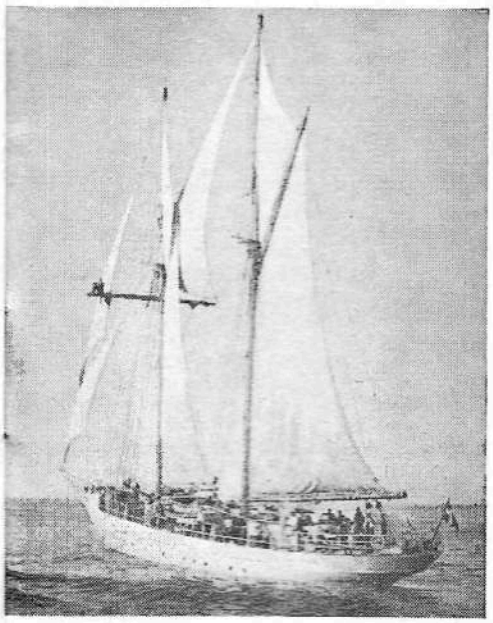
There are two $4\frac{1}{4}$ cwt bower anchors, Danforth pattern, with 140 fathoms of $\frac{3}{16}$ in. short chain link cable and an electric windlass. Other deck machinery includes an electric warping capstan on the aft deck, mechanical or hydraulic steering gear, and geared winches to handle the principal halyards and sheets.

Two 16 ft sailing boats with sliding Gunter rigs and Terylene sails are carried on deck aft. They are handled by swinging davits.

The masts and bowsprits are of steel, and all other spars of hollow spruce. The rig is that of a three-masted staysail schooner with 7,110 sq. ft of working sail area. In addition three squaresails can be set from the foremast.

All sails are of Terylene. The standing rigging is galvanised steel wire rope, and the running rigging





is also galvanised, with Italian hemp tails and purchases for all except the sheets, which are of Terylene.

From forward, the arrangement provides cadets' toilets and showers, two cadets' mess decks with messing facilities, sleeping berths for 34 boys, and the engine room and living accommodation for officers and ship's company.

The galley occupies the forward end of the deckhouse with two engine room entrances, and two deck toilets. The wardroom and the captain's cabin in the aft end are separated by a folding bulkhead so that they can be made into one room for entertaining.

Abaft the deckhouse is the raised bridge, with remote engine controls.

The aft peak forms the sail locker, and there is additional sail storage space in the store room under the aft accommodation. Provisions are stored under the forward mess decks and the forepeak is used for storage of paint and ship's gear.

Twenty tons of fresh water are carried in two built-in tanks forward of the engine room, and fresh water is supplied to all parts of the ship by a pressure set fitted in the engine room. The water is heated by an oil-fired boiler in the engine room, and radiators are fitted in all parts of the accommodation.

Two oil fuel tanks with a total capacity of ten tons are built-in forward of the engine room. Two main diesel engines of not less than 100 b.h.p. each drive manganese bronze propellers through reverse reduction gear boxes. Two diesel generators 12 kw. capacity are fitted.

The navigational equipment includes echo sounder, ship-to-shore telephone with direction finding and consul attachments, and an electric log with a remote speed and distance recorder.

In the permament ship's company, besides the captain, are the first and second officers, engineer, cook, bosun, leading seaman and two ordinary seamen.

The vessel will cost about £200,000 to build, and a further £100,000 will be needed for the fitting out and the running expenses.

● *Continued on page* 184

IPSWICH TO INDIA

By way of Princes Street
MICHAEL J. O'CONNOR
goes after a strange vehicle

IN a competition during the autumn of 1959 MODEL ENGINEER published the picture of a peculiar three-wheeled engine with a vertical boiler at the rear and an overall roof surmounted by a tall chimney. Behind it was a two-wheel coach bearing the words *Govt Steam Train*.

The competition invited readers to answer a set of questions about the picture. According to the answers published on October 29, the vehicle had been ordered in 1871 for the Indian Government at the suggestion of a Lieutenant R. E. Crompton, and had been tested between Ipswich, where it had been built by Ransomes, Sims and Head, and Edinburgh. After failing to uncover more information than was given in the answers, I abandoned the search. Then, a short time ago, in an old travel book I came across a chapter entitled "The Adventures of a Road Steamer."

The chapter was based on an account in the *Scotsman* of "a feat without parallel lately performed by a large road steamer—namely, running from Ipswich to Edinburgh by road, a distance of 450 miles, in 77 hours travelling time." The engine proved to be none other than the Indian Government Steam Train, and some facts about it were given.

It was of Thomson's patent design and had rubber tyres. Its 8 in. × 10 in. cylinders, working at 140 p.s.i., developed 14 n.h.p., but it had "several times been worked up to 80 indicated horse power." It weighed about 13½ tons and was 15 ft long, 8 ft 8 in. wide, and 15 ft high to the top of the chimney. The trailer, referred to as an "omnibus," weighed 3½ tons and seated 21 people on its enclosed lower deck, with 44 on its upper deck, where the only shelter was an awning.

The engine left Ipswich on Friday, September 15, in the charge of Lieutenant Crompton. At Stowmarket, 12 miles away, the town pump was unable to supply enough water for the engine's needs and "the thirsty monster was compelled to drink again" a mile or two further on. Men with saws and axes had to be stationed on the roof to cut a passage for the chimney through the overhanging trees.

Bury St Edmunds was reached in time for breakfast, 25 miles having been run in 4½ hours, including stops. Here an extra passenger boarded the vehicle, a photographer who refused to be put off.

Arriving at Newmarket in time for lunch, the engine was refused a supply at the water works and had to pump it from a cistern in the back yard of the Golden Lion. Another difficulty arose when the police ordered the engine to move on, and poor Crompton, who had probably had enough for one day, suggested that they should arrest the engine for refusing to do so. Fortunately, they took no notice of this; common sense prevailed and the engine continued its journey in peace, reaching Ely at 6 p.m.

After taking on coal and having dinner, Crompton engaged a guide to pilot him across the fens to Peterborough. The fellow lost his way ten miles from Ely and finished by directing the engine along the brink of a river 40 ft wide.

The road became narrower and narrower, until it was only a few inches wider than the engine, with the bank sloping down steeply on one side to the river and on the other to the fen. After about ten miles, a tube burst delaying the travellers for several hours.

That day they had covered 70 miles. On the next day they travelled only a short distance as they had to find a place where the engine could be left on Sunday. A Mr Jackson of Wansford put them all up until Monday.

The train resumed its journey at six o'clock on Monday morning and made a splendid run to Doncaster, covering the 83½ miles in 10¼ hours, including stops for water and coal. For most of the time the engine was running at 15-18 m.p.h.

Tuesday's run was from Doncaster to Azerley Hall, near Ripon, where the travellers were to stay for some days. The roads were in an awful state owing to heavy rainfall. All the rivers were in flood and clean water for the engine could not be found in pond or river.

The engine travelled from Azerley Hall to Darlington on the first of October and reached Wooler, near the border, on the third. After Morpeth the roads became very bad. Near Wooler they were "more like the channel of a gravelly burn than anything else."

Outside Morpeth a toll-gate keeper refused to let the engine pass and "the gentle power of steam had to be applied before the party could proceed." The toll-man went on to Wooler with them to give the engine in charge of the police. He was unsuccessful; indeed, the sergeant went to some trouble to find the travellers shelter.

Next day, after being loaded with coal bought by the "bowl," the train crossed the border and, by running all night, crossed the Lammermoor ridge early in the morning. It arrived at Edinburgh on October 5. Entering the city by the Dalkeith road, the engine swung into Princes Street.

Despite tramway obstructions, the train overtook all other traffic and ran by way of George Street to a coachbuilder's yard in the West End, where it was laid up. While in Edinburgh, it made several trial trips. On one of them it hauled 40 tons up Sontra Hill, an incline of 1 in 17 and about a mile long. It returned to Ipswich a few days later and was then shipped off to India. ▣

An account of the journey, with tables, will be found in A Century of Traction Engines *by W. J. Hughes.*

WHEN YOUTH SETS SAIL . . .

Continued from previous page

She will be able to take about 500 boys to sea each year on 14-day cruises. When she is in full operation, the fees should largely pay for the running. A cruise will cost from £35 to £40.

The boys will be sponsored in the main by industry, educational authorities and youth organisations.

According to the present plan, the ship will operate from British ports and will make 15 cruises a year, giving youths from all walks of life a taste of adventure.

As the Association is a purely voluntary organisation, the task of putting its decision into practice is tremendous. It is an act of faith and it deserves support.

Earlier I mentioned the bi-annual races of the STA. This year, of course, another falls due; the Torbay to Rotterdam race via Ushant.

Already many great ships have assembled in the Torbay area. Two members of MODEL ENGINEER staff, Oliver Smith and Brian Western, are down there with their cameras to report the start of the race. ▣

ROLLERS need not be CYLINDRICAL

ALAN SELWOOD describes a curiosity of special interest to all who ride square-wheeled bicycles

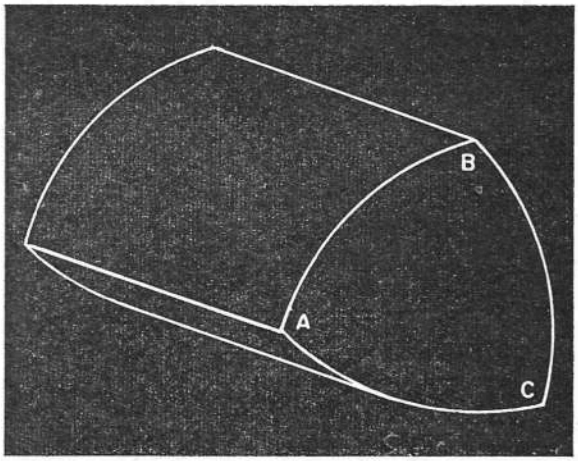


Fig. 1: It will act as a normal roller

You can tease your friends with these odd-shaped rollers. While they are anything but cylinders, they act as rollers in a perfectly normal way and can be used to roll one flat object over another without any bumping up and down at all. This comes as a surprise to most people; they assume that cylinders are the only shapes that will do this.

The roller has a cross section which is called a "curve of constant diameter" (see *Riddles in Mathematics* by Eugene P. Northrope; Penguin Books). When the roller is measured between parallel flats it is always found to have a constant thickness.

In Fig. 1, *A*, *B* and *C* are apices of an equilateral triangle. *AB* is an arc of a circle centred at *C*, *AC* is an arc centred at *B*, and so on. Each arc has the same radius; this is why the roller always has the same thickness.

It is quite easy to make a set of rollers beginning with three pieces of hexagon bar $\frac{4}{5}$ in. long and $\frac{1}{2}$ in. across the flats. The finished rollers will be $\frac{1}{2}$ in. thick and about 1 in. long.

The bars are stacked into a symmetrical bundle as in Fig. 2, and are bound together with a few bands of Sellotape. Grip the bundle in a three-jaw chuck at *PQ* and *R* so that about two-thirds of the bundle lies inside the chuck and one-third outside. It is important at this stage to align the rods in the bundle accurately and symmetrically.

Turn off two hexagonal faces from each bar on the exposed part of the bundle. This corresponds to the shaded part of Fig. 2 and generates one face of each roller.

To generate the second faces, remove the bundle from the chuck and take away the Sellotape. Then revolve each rod through 120 deg., bind the bundle up again, and machine off the zone shaded in Fig. 3. In this operation and in the next the exposed part of the bundle is supported and aligned only by the untouched parts of the rods which are gripped within the chuck.

The third faces are generated by taking the bundle to pieces once more, revolving the rods 120 deg., rebinding the bundle and removing the last three sets of hexagonal faces. The rollers can then be sawn off.

The three-lobed roller is the most exaggerated sort of non-cylindrical roller, but it is also possible to have symmetrical rollers with any odd number of lobes. We can conceive of a four-lobed solid made from four slices of a sphere stuck on to the faces of an equilateral tetrahedron. This solid would always have a constant thickness and would, therefore, be quite at home in a ball-race, but it would look rather like two ferrets in a sack. ▣

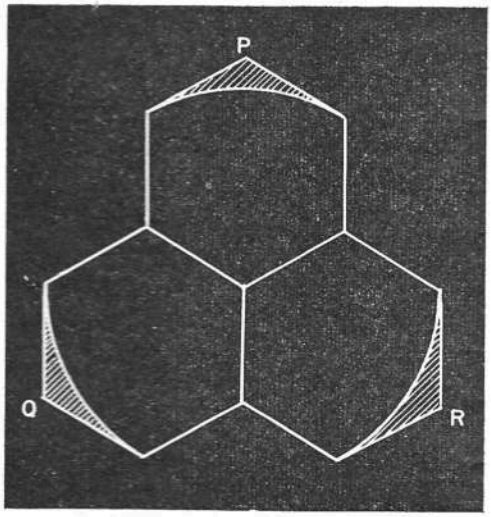


Fig. 2: First set of faces

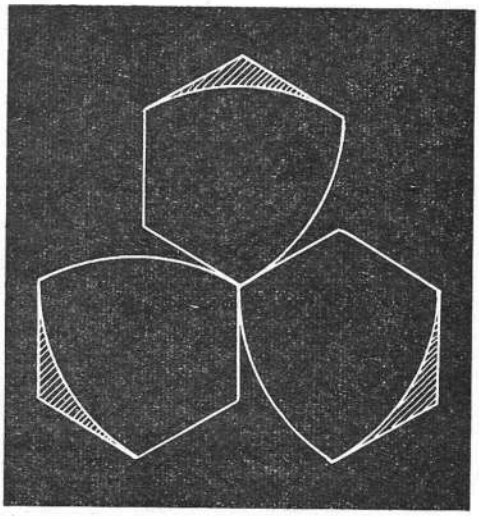


Fig. 3: Second set

BENDING SHEET METAL

By George Ward

MODELLERS making tenders and superstructures for their locomotives, or fittings for their ships, must often bend a piece of sheet metal to the required size.

Their problem is to discover the developed size in the flat before they do any bending.

Metal, when it is bent, stretches on the outer surface of the bend and is compressed on the inner surface. Somewhere in between it remains neutral. If we know the path of the neutral portion, we shall be able to find the total amount of metal needed to make a bend.

Practical tests have shown that the neutral line occurs at a point one-third of the thickness in from the inside face of the bend up to $\frac{1}{8}$ in. thick and 2/5 over $\frac{1}{8}$ in. thick. For a sharp right-angled bend in a piece of $\frac{1}{16}$ in. metal without any radius at all in the corner, the neutral line would occur 0.021 in. in from the corner of the angle. (Sketch 1.)

It will be seen that the distance round a quarter of a circle of radius 0.021 in. is the amount of material to be added to give the developed length for the bend. If the material is folded back on to itself, the extra allowance will be twice what it is for a right-angle.

Whichever method you favour for producing your bends, these conditions hold good, providing that you do not go above a quarter-inch or so thickness of metal, or hit the material so hard with a hammer that it is reduced in thickness at the point of bending.

Suppose that a bracket is to be made as sketch 2, in $\frac{1}{16}$ in. material with a sharp right-angled bend. We know that the developed size to cut will be the total amount for the bend, plus the sum of the two sides. And so the total length will be:

$$\frac{(1/3 \text{ of } 1/16'') \times 2\pi}{4} + 1'' + 2''$$

$$\text{or } 0.033'' + 3'' = 3.033''.$$

We cut a piece 3.033 in. long. After marking a line 2 in. from one end, we put the piece in the vice—the line level with the top sharp edge of the jaw—and tap it down square, knowing that the finished bracket will be to the dimensions stated.

When we cannot make a sharp inside bend we must consider the allowances for radii. All we need do is to find the allowance for the neutral plane on a larger radius.

For example, if the bracket shown in sketch 3 were required, the developed length would be found by adding the length around the greater radius of the neutral plane to the length of the arms as before:

$$\frac{(1/3 \text{ of } 0.062'') + 1/8'' \times 2\pi}{4} + 1'' + 2''$$

$$\text{or } \frac{0.146'' \times 2\pi}{4} + 1'' + 2''$$

$$\text{or } 0.229'' + 3'' = 3.229''.$$

Normally a bracket is either dimensioned from the outside or the inside sizes are given. This means that we must take the thickness of the material off each dimension to arrive at the centre point of the radius of bending if the outside dimensions are stated.

If angles other than a right angle are required, we have only to divide the total distance of the neutral bend by the factor obtained from dividing 360 deg. by the angle needed.

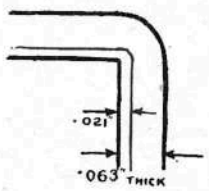
This formula can be used:

$$X = \frac{2\pi (R + Y)}{Z}$$

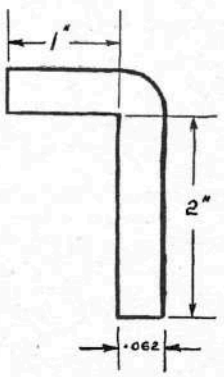
where

X=Length of stock required for bend.
R=Radius of bend.
Y=$\frac{1}{3}$ of stock thickness T. (2/5 if over $\frac{1}{8}$ in thick).
Z=Factor obtained by dividing 360 deg. by the angle (90 deg. bend, Z=4).
T=Stock thickness.

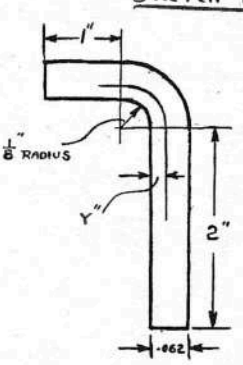
The table is for 90 deg. bends.



SKETCH 1.



SKETCH 2.



SKETCH 3.

Rad. Thickness	0	1/64	1/32	3/64	1/16	3/32	1/8	3/16	1/4	5/16
0.010	0.005	0.030	0.054	0.079	0.103	0.152	0.202	0.300	0.398	0.496
0.015	0.008	0.032	0.057	0.081	0.106	0.155	0.204	0.302	0.401	0.499
0.020	0.011	0.035	0.059	0.084	0.109	0.158	0.207	0.305	0.403	0.501
0.025	0.013	0.038	0.062	0.087	0.111	0.160	0.209	0.308	0.406	0.504
1/32	0.016	0.041	0.065	0.090	0.115	0.164	0.213	0.311	0.409	0.507
1/16	0.033	0.057	0.082	0.106	0.131	0.180	0.229	0.327	0.425	0.524
3/32	0.050	0.074	0.098	0.122	0.147	0.196	0.245	0.343	0.442	0.540
1/8	0.066	0.090	0.115	0.139	0.164	0.213	0.262	0.360	0.458	0.556
5/32	0.082	0.106	0.131	0.155	0.180	0.229	0.278	0.376	0.475	0.573
3/16								0.412	0.510	0.586
1/4								0.450	0.549	0.620

READERS' QUERIES

DO NOT FORGET THE QUERY COUPON ON THE LAST PAGE OF THIS ISSUE

- Queries must be within the scope of this journal and only one subject should be included in each letter.
- Valuation of models, or advice on selling cannot be undertaken.
- **Readers must send a stamped addressed envelope with each query and enclose a current query coupon from the last page of the issue.**
- Replies published are extracts from fuller answers sent through the post.
- Mark envelope "Query," Model Engineer, 19-20 Noel Street, London W1.

Time at last!

I want to build a static electricity machine, using for the plates ⅛ in. × 6 in. dia. brown paxolin. Will this material be suitable?

I still have the book in the MODEL ENGINEER Series (it cost 9d.) on the Wimshurst machine, and at last I shall have time to make it, using more modern materials if possible. —L.M., Copnor, Portsmouth.

▲ *As paxolin is a very efficient insulator, it should be quite satisfactory, particularly if it is well varnished before the sectors are attached.*

Gramophone records, although theoretically rather poor insulators because of the carbon in their composition, have often been used successfully.

Static electrical machines of all kinds may be liable to cause a good deal of trouble through interference with radio and television reception in the neighbourhood, and there is no effective way of suppressing this interference except by complete screening of the room containing the machine.

The handbook on the Wimshurst machine was No 32 *in the series and was published many years ago. It would be interesting to hear from other readers who read it—and perhaps made the machine.*

Narrow boats

I am interested in traction engines (I have modelled three) and steam rollers. Another of my interests is in the narrow boats on the inland waterways. Can you give me any information on these boats? Are they propelled by a twin-cylinder Bolinder diesel engine or a Blackstone cooled by water from the canal?

If I could get enough information, I would build a large working model. —N.G.H., Smethwick.

▲ *Bolinder and Blackstone engines powered the narrow barges on inland waterways. The engines are cooled by water circulated from the canal.*

Perhaps it would be worth your while to communicate with the British Transport Commission (Canals and Waterways Division) and also the Inland Waterways Association Ltd, 4 Emerald Street, London WC1. The Association has a Midlands branch at 14 *Park Hill, Birmingham; the secretary is Mr John Pitman.*

Own blast furnace

As a regular reader of your most interesting and helpful weekly, I wish to seek your advice on building my own blast furnace. It will be used for smelting brass, copper, and such like.

I should also like to know how much air supply to use under fan pressure.

I look forward to the day MODEL ENGINEER comes out.—R.M.R.,Blaenau Festiniog, Merioneth.

▲ *Presumably you mean a furnace for melting metal to make small castings.*

You do not state what fuel you propose to use. It is practicable to use gas, oil or solid fuel quite satisfactorily with a forced air supply. A gas burner would probably be the simplest to make, but the proportions of gas and air would need to be adjusted by experiment.

The term "fan pressure" gives no indication of the actual pressure as this varies with different fans. A domestic vacuum cleaner is capable of supplying a sufficiently powerful draught for melting most metals, including cast iron.

The ME handbook Foundrywork for the Amateur, (*5s. plus 5d. postage*) *would give you a good deal of practical advice on the construction of a melting furnace and other problems likely to be encountered in making castings.*

Beginner's choice

I hope to embark shortly on my first live-steam model locomotive. It will be of 3½ in. gauge. Although I am an engineer with a well-equipped workshop, I would like to follow instructions all the time.

This limits my choice of models to two. I have all the back numbers of ME describing the building of *Jubilee*, and I can always buy LBSC's book on *Maisie* on the construction of same. Another consideration is that they both have two outside cylinders.

As the Southampton Club's track is now in operation, I would like to choose the model which would be easier and quicker to build, and I would appreciate your opinion on which of these two models should win on that score. I think that perhaps *Maisie* would be easier to drive because of the open rear of the cab. What do you think?

Perhaps you have other ideas on what would make a suitable model for a beginner?—A.L.R., Southampton.

▲ JUBILEE *is a tank engine and would not take quite so long to make as* MAISIE. *However, the boiler of* MAISIE *is easier to build than the boiler of* JUBILEE.

ROB ROY *is the most suitable engine for a first attempt. The complete set of drawings may be had from PM Plans Service at* 22*s.* 6*d., post free. Castings can be obtained from A. J. Reeves and Co. Ltd., of* 416 *Moseley Road, Birmingham* 12, *or Kennion Bros, of* 2 *Railway Place, Hertford.*

Back numbers describing ROB ROY *and most of those describing* JUBILEE *are also in stock.*

A dilemma of horns

I notice that it is normal practice on model locomotives to put the main axlebox horns inside the frames and on a 5 in. gauge model to allow 4⅛ in. between frames.

I am simplifying the BR drawings of a Merchant Navy Class engine and redrawing it to 1 7/16 in. to the ft for 5 in. gauge. I notice that the horns are largely outside the frames and the distance between the frames is 3 ft 5½ in., which scales down to just under 3¾ in.

Do the inside horns and 4⅛ in. arrangements follow full-size practice, or is it "modeller's licence"? What ought I to do?

I have a supplementary question which concerns my large tender locomotive in this gauge. I shall

have to ride on the tender, as mentioned in the description of *Springbok*, as I have a ground-level line. I feel that the tender axleboxes should have ball-bearings. Is there room with the normal size axlebox to fit large enough ball-bearings?—J.V., Cheam, Surrey.

▲ *The fitting of the horns on the inside of the frames is normal British practice and the distance between frames of 4⅛ in. for a 5 in. gauge model is approximately to scale.*

If you are fitting the inside cylinder to your Merchant Navy model, it will probably pay you to keep to the conventional arrangement as this will give you more room for valve gear and so forth.

The tender axleboxes' journals should not be less than ⅜ in. dia. so that ⅞ in. ball races could be used. This would involve an axlebox width of 1 in., which is probably overscale.

Boiler for Double Ten

I intend to make a horizontal centre-flue boiler to power a Stuart Double Ten engine.

If I make the boiler 9 in. long and 4 in. dia. with a 2 in. dia flue, what thickness of copper tube should I use if the working pressure is 100 p.s.i.?

Would the boiler steam a Double Ten at maximum power?—M.R., Rosyth.

▲ *A boiler of the size specified should have an outer wrapper of a thickness not less than 3/32 in. with a flue tube of similar thickness, and end plates not less than ⅛ in. thick.*

This boiler, if fired by a burner of about the size employed for a one pint paraffin blow lamp, should steam the Double Ten engine satisfactorily at maximum power.

Model traction engine

I am interested in modelling a traction engine. My 3½ in. lathe limits the size, presumably to 1½ in. scale. Where can I get castings and drawings?

Could you please tell me whether the ME traction engine and Allchin articles are obtainable as back numbers or as booklet?—J.P., Aughton, Lancashire.

▲ *You can obtain castings for building a traction engine from: Dick Simmonds of 5 South Road, Erith, Kent; Bonds Ltd., 357 Euston Road, London, NW1; and A. J. Reeves and Co. Ltd., 416 Moseley Road, Birmingham 12.*

Working drawings for 1 in. and 1½ in. scale may be had from PM Plans Service. Plans are also obtainable from Dick Simmonds.

Articles describing the building of the MODEL ENGINEER *traction engine in 1 in. scale and the Allchin in 1½ in. are not published in booklet form. You may, however, be able to obtain the back numbers from Lens of Sutton, 50 Carshalton Road, Sutton, Surrey.*

Stand for lathe

I have bought a new ML7 lathe and I have encountered some difficulty in mounting it on a satisfactory stand. Until recently the machine was mounted on a wooden cabinet which had three 1 in. thick boards on top to support the lathe. The boards warp with the varying humidity in the workshop, and this causes "run out" over the lathe bed.

I am, therefore, proposing to mount the lathe on a standard Myford drip tray with hard rubber pads sandwiched between the tray and the cabinet top. This, I hope, will afford a certain amount of resilience and overcome the difficulty.

Before proceeding with my scheme, I would like to know whether there are any points which I have overlooked.

Naturally, I appreciate that the Myford steel cabinet is ideal for mounting the lathe, but this is, unfortunately, beyond my limited financial means.—A.M.J., Potters Bar, Middlesex.

▲ *The method of mounting which you describe is quite practicable, but an even better way would be to place rigid pads of semi-hard rubber at the headstock and soft rubber at the tailstock end.*

It is even possible to construct a form of three-point mounting by placing the tailstock pads on a central articulating support; but this would be more difficult and hardly necessary.

Many lathes used by ME readers are mounted on wooden benches, with quite satisfactory results.

Clock fast

As an amateur, interested in all kinds of clocks, I have once or twice met with a trouble I cannot overcome. Perhaps you can clear it up for me?

The clock requires a new hairspring. One is put in but the clock gains badly, with the regulator full slow. The way that the regulator acts, automatically lengthening or shortening the place of grip, one suggests a longer spring, but a bigger one will not go in between the centre and stud. Possibly the pallet pins allow the escape wheel to slip by too easily, but if they are bent or altered in thickness the clock keeps stopping. The hairspring is new, and as fitted by the makers of the clock. —A.R.W., Wallingford.

▲ *If the clock runs at too fast a rate with the regulator in the slow position, this indicates that the length of the spring should be increased, or its strength reduced. The spring does not necessarily have to be larger. Altering the pallet pins or other parts of the mechanical motion will not influence the rate of the clock.*

It is hard to understand why a new hairspring fitted by the makers of the clock should not be properly rated, unless the spring has been shortened in some way, or is anchored at some distance from the extreme end, in order to set the balance wheel into beat—but this should be done by shifting the spring collet on the balance staff.

Name plates

I have to make some name plates to fit on the top and bottom of a radiator of a model eight-wheeler lorry.

On the full-size vehicle the plates are aluminium castings with relief lettering.

Will you please tell me if a Duplex engraving machine would be capable of copying the plates to a scale of one-eighth full-size, using the full-size name plates as the copy? I intend the name plates to be made of brass.

As the thickness of the original is only about 3/16 in. and the depth of relief about 3/32 in., the thickness and depth (to make the thing possible) would be 1/16 in and 1/32 in.—C.B.W., Cefn Mawr, North Wales.

▲ *The Duplex engraving machine or a similar pantograph would be capable of carrying out the work.*

Most of these machines will only make two-dimensional copies, and therefore the depth of the cutting would have to be regulated by the vertical adjustment of the cutter, and would not necessarily bear any scale relation to the depth of the original engraving. Some machines have the ability to copy to scale in three dimensions, but they are not very common.

Many engineering and instrument firms have engraving machines.

POSTBAG

The Editor welcomes letters for these columns. A PM Book Voucher for 10s. 6d. will be paid for each picture printed. Letters may be condensed or edited

MODELLING IN A FLAT

SIR,—It seems inevitable that the trend will be towards more flats and fewer houses. With the increasing population, the rising price of land, and the justifiable restrictions on green-belt building, the proportion of flats to dwelling houses will increase as the years go by.

This situation may be all very fine for the planners, and for those who like the easier responsibilities of flat life, but it takes no account of thousands whose hobbies need a workshop.

Some may say that it is possible to pursue model engineering on the fortieth floor of a skyscraper, but it would be a limited hobby. I would not like to braze *Firefly's* boiler or hacksaw the mainframes up there.

This is a subject which has been mentioned before in ME. It is time that the planners took account of it.

Harrow, L. BERTRAM.
Middlesex.

TOPSLIDE

SIR,—May I suggest that the simplest method of increasing the range of angular movement of the "Myford" topslide [Queries, May 24] is to mark on the top surface with a scriber the outline of the part-circular slots, rotating the topslide as necessary to continue the outline of the slots to the right and left-hand edges of the cross-slide?

Centre punch the cross-slide at four places, $\frac{1}{4}$ in. in from either edge, and centrally in the outline of the slots. Drill No 5 drill to $\frac{1}{2}$ in. deep, and tap $\frac{1}{4}$ in. BSF.

Using two $\frac{1}{2}$ in. set screws $\frac{3}{4}$ in. long, with washers under the heads, you can rotate the topslide to within 5 deg. of a right angle to the lathe ways and secure it.

Clearance for the topslide feed screw dial and handle is still a problem, but an extension can readily be arranged.

Victoria, W. H. MACMAHON.
Australia.

OLD-TIMER

SIR,—I was delighted to see in ME for June 21 a query from a fellow enthusiast here in Charlton, London. I can supply K.A.S. with all the information that he needs as I have a number of LBSCR engines in the original Stroudley liveries. The paints were obtained from the Brighton works in 1913.

I was one of the founder members of the original Model Railway Club in 1910 with the late Mr W. R. S. Smart, the late Mr T. W. Pitt and many others now long passed away. I alone remain.

My age and ill-health prevent me from travelling to the present Model Railway Club and I would greatly welcome a kindred spirit here in Charlton.

My LBSCR Atlantic and Mogul were illustrated and described in MODEL ENGINEER for 15 March 1923.

I have a Stroudley Single Stephenson No 329, a Gladstone 0-4-2 express, the Stroudley No 184 in umber brown livery, and a Stroudley Terrier *Boxhill* and a number of other Brighton locomotives. All are O gauge steam and clockwork.

Charlton, STANLEY H. M. FISH.
London SE7.

WATCH HIS EYES

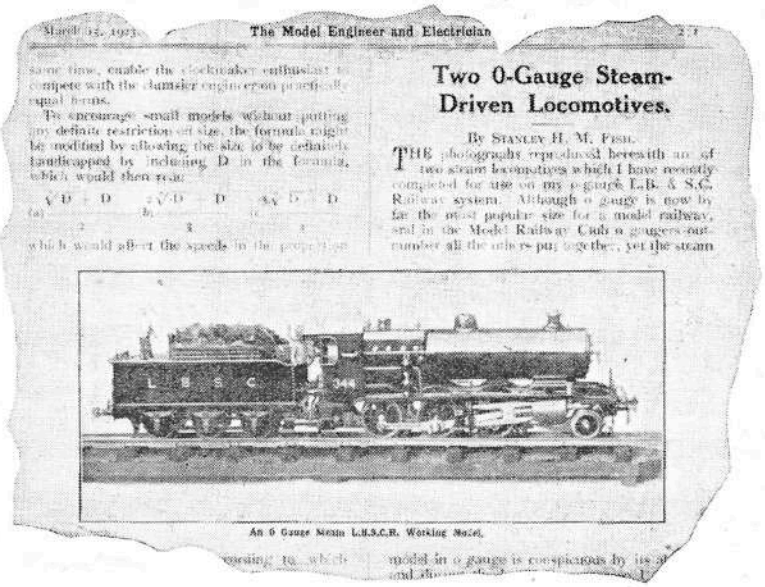
SIR,—I have read the letter "Watch Their Eyes" in Postbag. I have one whole morning's work a week in the metalwork shop at school. About seven weeks ago I began a small working model of Stephenson's *Rocket*. So far I have completed all the wheels and have begun on the pistons and cylinders. My metalwork teacher has lent me books and drawings showing the making of the oscillating cylinder.

My age is 15. I am in my fourth year at a secondary school near Leicester and I am staying for a fifth year. I hope to get the model near to completion by the time I leave.

I have been reading the ME since January and I intend to take it for many years to come. I was very glad to see more traction engines in this week's issue as both my father and I are very much interested in them.

Long may ME prosper.

Groby, TOM SWINFIELD.
Leicester.


The Model Engineer and Electrician

Two 0-Gauge Steam-Driven Locomotives.

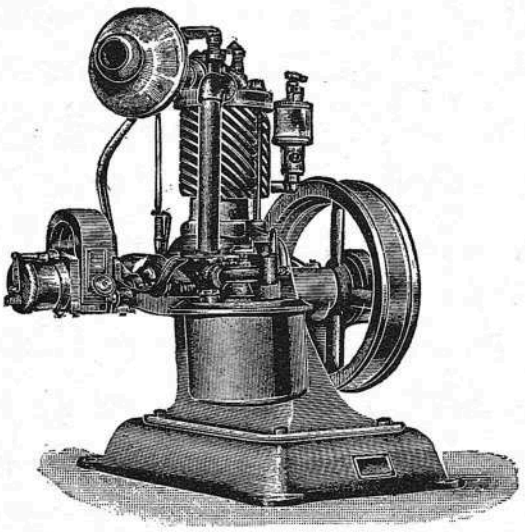
By STANLEY H. M. FISH.

THE photographs reproduced herewith are of two steam locomotives which I have recently completed for use on my 0 gauge L.B. & S.C. Railway system. Although 0 gauge is now by far the most popular size for a model railway, and in the Model Railway Clubs 0 gauge outnumber all the others put together, yet the steam

An 0 Gauge Steam L.B.S.C.R. Working Model.

model in 0 gauge is conspicuous by its

Stanley H. M. Fish, founder member of Model Railway Club in 1910, *built this LBSCR engine* 40 *years ago. It was described in* MODEL ENGINEER *in* 1923



Petrol engine with an exhaust silencer guaranteed to stop "battle-like noises"

NO WAR

SIR,—The petrol engine found by H. H. Ward of Wirral in a junk store (What Is It? Postbag, July 19) is the Standard Big Power Small Engine sold by J. S. Millar and Son of Annan. I cannot recall if Millar's made the engine, but I well remember seeing them ticking over on their stand at the Royal Shows some 30 years ago. They were sold to drive small water pumps and so forth.

Readers may be interested in the makers' illustration. The description of the exhaust silencer says that it prevents "battle-like noises."

Old Brampton J. C. AUSTIN.
Chesterfield.

SIR,—The internal combustion engine found by Mr Ward (Postbag, July 19) was manufactured in 1918 by Mr A. M. Stansfield of 31 Broom Street, Levenshulme, Manchester. It was described in the MODEL ENGINEER of 25 April 1918.

The bore and stroke were given as 2¼ in. Normal speed was 1,000 r.p.m., producing nearly ¼ h.p. The engine has a very unusual carburation system.

If Mr Ward will write to me I will reproduce the text for him.

Newport, J. HALL.
Mon.

SILVER STEEL

SIR,—While "silver steel" and "drill rod" are synonymous, the English and American terms for the same thing, numbered silver steel sizes are not the same as the numbered drill sizes.

Silver steel comes under the Stubs' steel wire gauge and drill rod under the Morse drill gauge. They are very close, but are still not the same.

Wood Green, W. ADDISON.
London.

STROUDLEY GREEN

SIR,—Prince Marshall's theory is an interesting one, but I doubt very much if it is correct. Hamilton Ellis in *Twenty Locomotive Men* describes how Patrick Stirling once wrote to Stroudley, referring to his "improved engine green" in somewhat ribald terms; he would hardly have bothered to have mentioned the matter had the main body colour been, in fact, green, instead of the well-known yellow ochre.

F. Burtt, a well-known authority on LBSC matters and a former Brighton man himself, says in his *LBSCR Locomotives, 1870-1927*: "Stroudley . . . changed the colour scheme on the passenger engines to yellow, which he designated *Improved Engine Green*."

London W1. MARTIN EVANS.

NELSON'S GUNS

SIR,—E.A.R. in Hampshire asks for information on cannons.

The *Victory* carried 32 pounders on the lower gun deck, 24 pounders on the middle deck and 12 pounders on the upper deck. She also carried 68 pounder cannonades.

Excellent scale drawings of these guns are obtainable from Underhill Plans, Baltonsborough, Glastonbury, Somerset, for about five shillings. I have had several and can recommend them.

Hull. A. L. HAYES.

BOAT FUELS

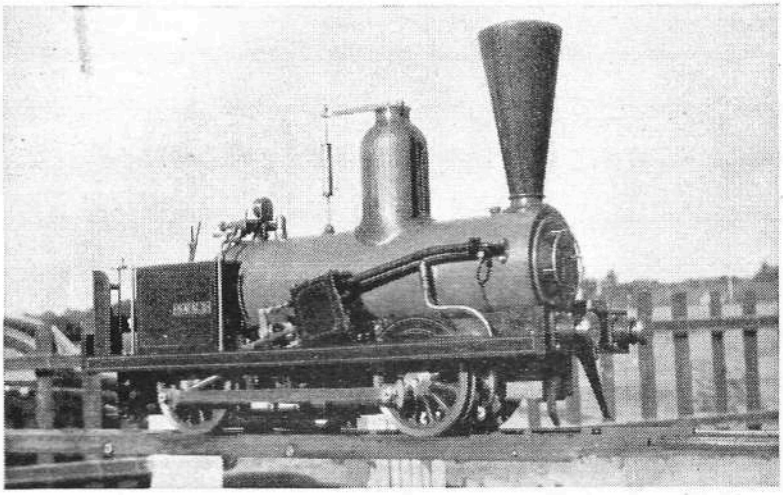
SIR,—Reading the Query by J.R.S. of Bressay in the Shetlands on fuels for his son's power boat, I remembered the days when I had the same trouble. I tried all the fuels, but different engines seem to prefer different mixtures. By increasing the odd parts (stepping up some and decreasing others) I obtained different results.

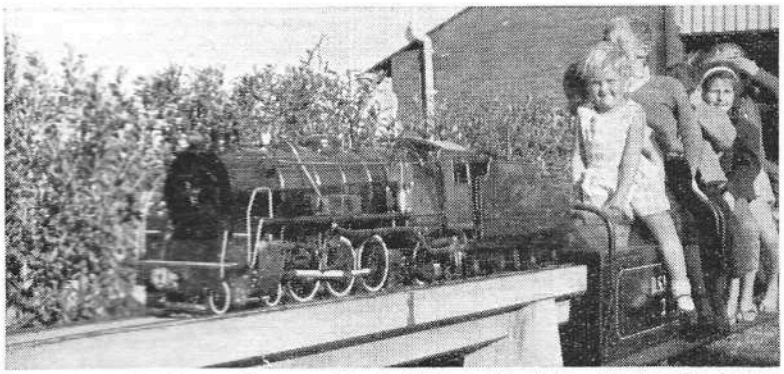
I have a 3.5 c.c. ED Hunter in a 31 in. crash tender, and can obtain 12-15 m.p.h.

Croxley Green, E. J. CLARK.
Hertfordshire.

DIESEL FUEL PERCENTAGES

Ether	Castor Oil	Paraffin or T.V.O.	Petrol	Castrol R	Castrol XXL or SAE 40	Redex	Derv	Amyl Nitrate or Nitrite	Remarks
35.5	25	37						2.5	Equals Mercury 8 fuel
35	20	38				Up to 5		2-4	Recommended for Oliver racing engines
40	22	30				Up to 8			A good hot fuel
33 1/3	33 1/3	33 1/3							Dirty, will run most engines, good for running-in
60						40			Good for small and fixed-head engines
37½		37½		25					Good contest and racing fuel
40				40			20		Good for big racing engines
45			45		10				Good for cold starting and fast well-cooled (marine) engines





D. F. Holland saw these engines on the track of the Durban Society of Model Engineers at Kellaway Park. He says that the Natal 0-4-0 *is a model of the first locomotive to run in South Africa—in* 1860

MODELLING IN DURBAN

SIR,—During a recent hurried visit to Durban, I went to Kellaway Park, the home of the Durban Society of Model Engineers.

The *Natal*, 0-4-0 type, was built as a club project and is a model of the first locomotive to run in South Africa on 26 June 1860. The original is standing on Durban Station. The model is not exact to the original, having been slightly modified to make a successful working engine. It did good work, passenger hauling at the recent exhibition staged by the DSME. The workmanship is a credit to the club.

The other engine is John Wombel's 1 in. scale class 160A SAR locomotive. This good-looking engine was busy on the club track passenger hauling.

Johannesburg. D. F. HOLLAND.

CELTIC GIANT

SIR,—*Pride of the Shannon* is Fowler Class A5 showman road locomotive No 15713, delivered to David Donelly of Limerick during May 1924. I drove her from North Wall in Dublin down to Limerick as the fair was being held in the old barrack ground. She was steered by Jack O'Sullivan, who was the owner of a Fowler threshing engine.

A year or two ago I had a letter from a person at Kildare telling me about this engine in Ballina. All the copper pipes and part of the brass work had been taken off.

"Restoring a Giant" on June 21 was highly interesting to me. When I was travelling in Scotland in 1926, I saw the engine *Carry On* making power for riding machines and light. In September 1961 I went to see her in Mr Statham's garage. She is Fowler No 14425, sold to the War Office on 2 May 1916. She was bought by C. Openshaw of Reading on 27 June 1920, and after having been overhauled and converted to a showman was sold to Cadona Bros of Glasgow in February 1925. Cadona Bros sold her to Kevin McGovern in Ireland in 1943. He used her until 1952 and then sold her to Mr McDowell of Newtonards. She was later bought by a Mr Ellis of Kildare, who sold her to Mr Statham.

She has a long class B6 firebox. Her hind wheels are 7 ft dia., or 7 ft 9 in. with the rubber.

I well remember these engines being built as I have been with Fowlers for 66 years.

Poole, Dorset. ALFRED PEPPER.

SIR,—*Carry On* was built in 1915, on a War Department order. She was bought from the War Department with several other engines by a Mr Charles Openshaw and converted by him for fairground use. Anyone familiar with showmen's engines would know at a glance that *Carry On* is fitted with a dynamo plate which came off a Foster showman's road locomotive.

Carry On was bought from Mr Openshaw by the Cadonas, famous Scottish show people, and was eventually purchased by me from Mrs Lucy Cadona, widow of Frank Cadona, early in 1945.

I retained the engine until early 1954, and so *Carry On* had only two showman owners in her fairground days in Scotland and Ireland.

I sold the engine in early 1954 to Mr John McDowell, quarry owner, of Carrodare, Co. Down. When I last saw her the paintwork was in very bad condition, and I assume that the crude silver lines mentioned by John Clive were the work of some of her later owners.

I was pleased to see the photograph of the engine taken at Hastingwood, but I found it most amusing to note that the "Irish livery" had been carefully traced in the repainting process. The scrollwork and the star on the flywheel only need comparison with the earlier photograph taken at Dublin Docks, and so I am particularly gratified to know that the present owner does not share Mr Clive's opinion of the quality of the Irish decoration.

JAMES KEVIN MCGOVERN.

Warrenpoint, Co. Down.

WORKSHOP FLOOR

SIR,—I am hoping to build a small workshop and I am wondering what to put on the concrete floor. I need something to stand up to hard wear and be warm to the feet in winter. Wood is one choice. Are there others?

Canonbury, London N1. K. BARRETT.

CLUB NEWS

Send news and notices to The CLUBMAN, 19-20 Noel Street, London W1

SURREY SHOW

A MODELS exhibition and competition organised by the *Guildford and Godalming Times* and staged at Stoke Park in conjunction with the Surrey County Show on a recent weekend, proved a big attraction and brought 20,000 visitors to inspect the 200 exhibits which were totally valued at £5,000.

History, communications, transport and theatre, all were represented in the display. The award for the best-in-show went to Mr M. Shepherd, of Vickers Model Club, for his model of a Vickers *Vimy* commercial aircraft, valued at £1,000 and destined to be placed in the Science Museum on permanent loan. The most unusual model on show was the Automatic Rhythm Maker, devised and built by Mr J. Titheridge, of Milford. An accordionist, particularly interested in the broken rhythms of the Balkan dances, Mr Titheridge conceived this model as a mechanical means of providing appropriate percussion effects. Its basic principles are those of the musical box or barrel organ.

The exhibition included a number of interesting railway layouts, ships, vintage cars and traction engines and both senior and junior classes were well supported. The exhibition was organised by a committee comprising Mr V. H. R. Selley (secretary, Guildford Model Engineering Society), Mr M. J. Shepherd (Vickers Model Section), Mr W. Titcomb (chairman, Vickers Model Section), Mr R. Symes Schutzmann (chairman, BBC Model Railway Club), Mr G. B. Reeves (editor of the *Guildford and Godalming Times*) as chairman, and Mr R. Ralph as secretary-organiser. The prizes were presented by Miss Monica Chapman, producer of the BBC feature "Desert Island Discs."

GOLDEN GATE LOADER

New unloading facilities at the recently-completed 5 in. and 7¼ in. gauge ground-level loop, added to the Golden Gate Live Steamers track, proved very popular with the many visitors who brought 24 engines to a recent meeting.

The heavy locomotives were easily transported from station wagon or trailer and placed on an adjustable apron connected to a turntable which could position an engine in the steaming bay or main line, as required. Once inside the track area, engines could be raised from ground to track level without manual effort.

Thicker rails on the new loop were found to give excellent traction and smooth running.

TIP FROM J'BURG

Some useful tips on buying and using hacksaws come to us from Mr D. F. Holland, secretary of the Johannesburg Live Steamers. Writing in the club's journal, the excellently produced *Live Steamer*, he says that sawing accurately is no problem if the hacksaw is canted to correct wander.

But, he adds, this trick is much easier with a flat-framed than a tubular-framed saw, so watch what you buy.

And remember to use all the teeth. After all, you paid for them. Long slow strokes are best; quick short strokes spoil the set of the teeth, and when the unworn sets at each end enter the cut they cause the saw to stick and perhaps break.

RALLY ROUND

August 10-11 Worcester Rally. *Traction engine events held in association with the Royal Worcester Agricultural Show at the Worcester Racecourse.*

August 11 Enfield Veteran Vehicle Society. *Rally of steam engines, commercial vehicles and private cars. To be held at Albany Stud Farm, Epping New Road (A11), Buckhurst Hill, Essex.*

August 11 New Milton. *Rally at New Milton in Hampshire.*

August 11-12 Pickering Rally. *Rally at Pickering, near Scarborough, Yorkshire.*

August 14 Leek. *Traction engines in steam at Leek Agricultural Show, Staffordshire.*

September 8-9 Ickleton Rally. *Organised in aid of the Ickleton village Church and School. To be held at Ickleton, near Audley End and Saffron Walden, Essex.*

September 15 Fakenham Rally. *To be held at Fakenham, a few miles NW of East Dereham, Norfolk.*

September 22 Kelvedon Rally. *Organised by the East Anglian Traction Engine Club. To be held at Kelvedon, near Colchester, Essex.*

CLUB DIARY

Dates must be sent at least four weeks before the event

August 10 Coventry MES. Track meet.

August 11 Historical MRS. Visit to St Rollox Carriage Works.

August 11 or 12 West Midlands MPBA Regatta at Sheffield.

August 11 Ramsgate Model Club. Operation of all layouts at the St Lawrence Fete and Gala Day at Ramsgate at noon.

August 11 Enfield Veteran Vehicle Society Rally. Buckhurst Hill. Chingford MEC will operate portable track.

August 12 North London SME. Birchington regatta, Park Lane, Herne Bay.

August 12 Grimsby and Cleethorpes MES Regatta, Sydney Park.

August 12-19 MYA. "A" class championship at Gosport.

August 12-19 British MYA Open Championship for 1962. For "A" class boats. To be held at Gosport.

August 12 York SMEE. Track day at Bishopsthorpe.

August 12 City of Leeds SMEE. Working meeting at Temple Newsam at 9 a.m.

August 12 Birchington MPBC. RC regatta at Park Lake, Herne Bay.

August 12 Harlington Locomotive Society Track day at 2.30 p.m.

August 13 Wirral MES. August meeting at 102 Chester Street, Birkenhead at 7.30 p.m.

August 14 City of Leeds SMEE. Working meeting at Temple Newsam at 6 p.m.

August 15 Grimsby and Cleethorpes MES. Monthly meeting, clubroom, 7.30.

August 18-25 Redrush METE. Exhibition in aid of St John Ambulance funds, Ambulance Hall, Basset Street.

August 19 West Riding Power Boat Assoc. Second leg of Roses Regatta at Fleetwood at 11 a.m. (SR, nomination, RC steering, RC speed, balloon bursting, hydroplanes.)

August 19 Maidstone MES. Track day at Mote Park.

August 19 Coventry MES. Public running.

August 19 City of Leeds SMEE. working meeting at Temple Newsam, 9 a.m.

August 19 Worcester SME. Track day at Waverley Street, Diglis, Worcester.

August 19 Southampton MES. Regatta for SP and SR craft at the Ornamental Lake, Southampton.

August 19 MPBA and Fleetwood MPBC. Northern Championships. RC regatta.

August 19 North London SME. Regatta at Ornamental Lake, The Common, Southampton.

August 19 North London SME. Northern Championships regatta, Fleetwood.

August 20 Wigan MES. Meeting at the Co-operative Guild Rooms, Whelley, Wigan, at 7.30 p.m.

August 21 City of Leeds SMEE. Working meeting at Temple Newsam at 6 p.m.

August 22 Southampton and District SME. Meeting, 20 Carlton Crescent, 8 p.m.

August 24 Greenwich and District SMS. Intermediate meeting at the Newton Room, Charlton House, Charlton SE7.

August 24 Coventry MES. Clubroom meeting.

August 23 Eltham Small Locomotive Society. Visit to Maidstone MES track at Mote Park.

August 25 North London SME. Portable track at Friern Barnet Summer Show at Friary Park.

August 25 York SMEE. Public running day at Bishopsthorpe.

August 26 Norwich SME. Public running at Eaton Park, Norwich at 3 p.m.

August 26 Brighouse and Halifax SMEE. Club visiting day.

August 26 Leicester SME. Open day at the track for private running.

August 26 City of Leeds SMEE. Working meeting at Temple Newsam at 9 a.m.

August 26 Woburn MPBC. SP regatta at Duncombes Breeches, Woburn Abbey.

Advertisements, with remittance, should be sent to Classified Department, Model Engineer, 19-20, Noel Street, London, W1, by latest Thursday morning prior to date of publication. Advertisements will be accepted from recognised sources by telephone. GERRARD 8811. Ex. 31.

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WORKSHOP EQUIPMENT

Buck & Ryan for Lathes and Workshop Accessories, drilling machines, grinders, electric tools, surface plates, etc.—310-312, Euston Road, London, N.W.1.

Eagle Surface Grinders from £188. Early deliveries. Cash or terms.—VICTA ENGINEERING, Maidenhead, Berks.

Myford ML7 and Super 7 Lathes for prompt delivery. Cash or terms.—VICTA ENGINEERING, Maidenhead, Berks.

New Marlow Vertical Mills 22" × 6½" motorised, from £210. Cash or terms.—VICTA ENGINEERING, Maidenhead, Berks.

Nuts, Screws and Washers. Mixed parcels of 432 parts, 2, 4 and 6 B.A. steel in round head, cheese-head or countersunk, 7s. Ditto brass 9s. 6, 8 and 10 B.A. ditto steel, 6s. 6d., brass 8s. 6d. Also other sizes. Send for free list over 140 interesting mixed lots and 3,500 "Bobpaks" (1s. packs).—K. R. WHISTON, Dept. SME, New Mills, Stockport.

Anglian Range. Saw spindles, 10" R/F, sawbenches 6" and 8" planers, 6" sawplanes and woodworking lathes. Send 6d. postage for brochures to the—EAST ANGLIAN TRADING Co., 5, Guardian Road, Norwich. NOR 55A.

Wanted. Head and tail stocks for 3½" Drummond flat bed lathe. Also any other fittings for same.—KELLY, Westholme, Kirk Michael, Isle of Man.

Illness Forces Sale—Can't Use. South Bend Light Ten bench lathe, self-contained ½ h.p. motor drive, 4½' bed, 34" between centres. Automatic change gear, power cross feed, 12-spindle speeds. Almost every attachment including milling, cutters, tools, 6 chucks etc., etc. Also 5" Perfecto bench shaper and motor. Both purchased new. Both used less than 100 hours. Three steel drawer cabinets, tools, mikes, reamers by 1/64" up, etc. Also (old but good—no motor) 27" planer. Also complete small printing plant: 7" × 10" Chandler & Price hand press, three stands loaded with new type, all accessories. Make an offer all, or part. Stand any examination any time.—M. VAN WINKLE JR., Box 156, Little Silver, New Jersey.

New By Post. Wood chisels ¼", ⅜", ½", ⅝", 1", 20s. 1 lb. brass screws, 2 B.A. to 8, mixed, 7s. 6d. 1 lb. steel above, 5s. 6d. 30 H.S. drills, 31-60, 15s. 60-80, 20s. 40 thread dies 1/16", 5/32", ⅛", 7/32", ¼", 3s. 6d. each. Taps 5/32", ⅛", 7/32", ¼", 40 threads, 2s. each.—Burnerd 4" independent chucks, 75s.—M. SHAW, 7, Hemgist Street, Manchester 18.

Beginner's Small Lathe Headstocks and Tailstocks, from 3s. each. Beds from 5s. T rests 3s. Heavy treadle wheels, scrap prices. Small accessories of all kinds very cheap.—PIKE, 98, Brenthouse Road, Hackney.

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Sale. Myford ML7 and accessories, £80.—Pumping Station, Henham, Bishops Stortford, Herts.

3½" Lorch Precision Lathe with every known attachment and accessories. All collets, chuck and tools. Also 10 mm. Pultra precision lathe with milling attachment, chucks, collets, clutch gear and motor.—Box No. 213, MODEL ENGINEER Offices.

Catseye Lathe Tool Height Setters. Now available. As supplied to engineering industry. Gives clear visual reading with no moving parts to wear. An important safeguard when parting off or using tipped tools. With full instructions, 13s. 6d. post free.—RODGERS & GEARY LTD., Carlisle Street, Leicester.

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2 Railway Place, Hertford, Herts.
Phone 2573

Myford ML7. Cabinet stand, 1/3 h.p. motor, all standard equipment plus many extras. Buyer collect.—HARDACRE, 153, Prospect Road, Scarborough, Yorks.

Portass 3½" Lathe. B.G.S.C. motor, 3- and 4-jaw Burnerd chucks, face plate, tools, etc., £40 o.n.o.—8, Nelmes Way, Hornchurch. Phone: HOR 42307.

Worthington Water-Cooled Air Compressor. 2½" bore, 3" stroke. Good condition, £10, o.n.o.—FROST, Takeley, Bishops Stortford.

MODELS AND FITTINGS

For Sale. Beam engine 1823, good working order, all copper and brass. Best offers to —PETER WENHAM, c/o The Royal Standard, Baxter Row, Dereham.

Workshop Capacity available for orders for steam locomotives not under 7½" gauge, from end November. Machining of parts to order undertaken.—Box No. 211, MODEL ENGINEER Offices.

DICK SIMMONDS & CO
5 South Road, Erith, Kent

Drawings and materials for our celebrated 0-4-0 Tank Loco "Hercules" in 7½" Gauge. "AJAX" in 5" Gauge and "BEATRICE" in 3½" Gauge. We hold large stocks of castings for many "L.B.S.C." Locos at keen prices.

We are specialists in Boiler Construction and we braze customers' boilers.

Send 9d. in stamps for complete lists.

Wanted. Well made model paddle steamer about 4 ft., suitable for radio control. Also water-cooled i.c. engine, preferably twin cylinder, approx. 30 c.c. for R/C boat.—Box No. 216, MODEL ENGINEER Offices.

Petrol Engines. Brand new, complete, 30 c.c. 2-stroke. Miniature power unit for many applications. £7 19s. 6d. c/paid. S.A.E. details.—MOLDON, 366, King Street, London, W.6.

For Sale, 3" scale Burrell drawings and castings. Machining service any component.

"Lion Head" Milling and Drilling machine for attachment to 3½"-6" lathes or self-contained unit. Partly machined castings supplied.

S.A.E.—LION ENGINEERING CO., 81, Linden Gardens, Enfield, Middx.

Wanted. "M.E." beam engine, Rocket loco, paddle steamer engine in very good condition, finished or almost finished.—Box No. 215, MODEL ENGINEER Offices.

"Tich" 3½" Gauge. Completed chassis with wheels and feed pump. Copper boiler with regulator. Other finished items. All castings and drawings. £15. S.A.E. full details, completion prevented by unforseen circumstances.—MILLER, 73, Searle Street, Cambridge. Tel.: 54796 evenings.

½", ¾", 1" Scale Coal-Fired Locos. Contents of a first-class exhibition. Some 30 engineer-built locos of highest standard together with running track and equipment, also very large quantity "O" gauge Mills track, points and crossovers. Large quantity Bassett-Lowke gauge "1" electric track, points, crossovers. Photos etc.—H-K., "Spire House," The Park, Mablethorpe, Lincs.

3½" Gauge Coal-Fired 2-8-0 Loco and Tender, Walschaerts gear, injector, pumps, mechanical lubricators, £65. New Myford ML7 lathe. Complete motor, chucks tools, £90. S.A.E. reply.—SOUTHERN, 37, Welwyn Road, Hinckley. Phone 4068.

ELECTRICAL

A.C. Motors, Self-Start, induction, 200/250 v., 50 cycles, 1-phase, 1,425 r.p.m., ¼ h.p. 87s. 6d., 1/3 h.p., 105s., ½ h.p. £6 15s. Perfect and guaranteed, carriage England, 7s. 6d.—JOHNSON ENGINEERING COMPANY, 319, Kennington Road, S.E.1. RELiance 1412/3.

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Rare Exciting Opportunity acquire profit-making miniature steam passenger-carrying railway. Lovely site sea front at Sandown, Isle of Wight. Handsome profits, congenial occupation. Established 11 years. Audited accounts. Sacrifice going concern inclusive, £900.—Box No. 196, MODEL ENGINEER Offices.

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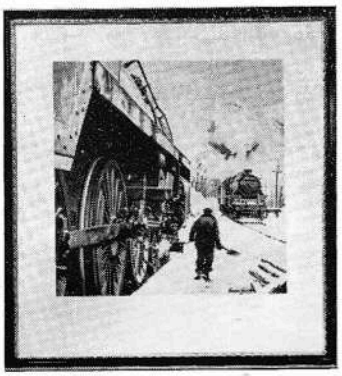

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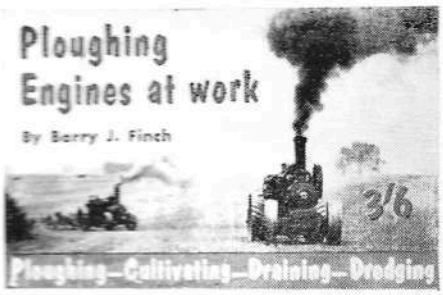

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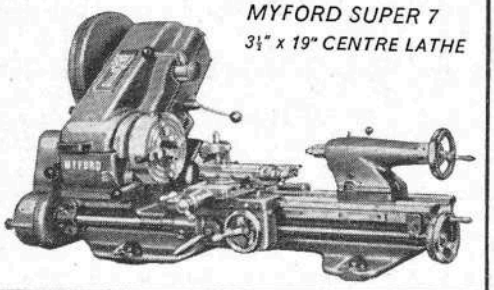

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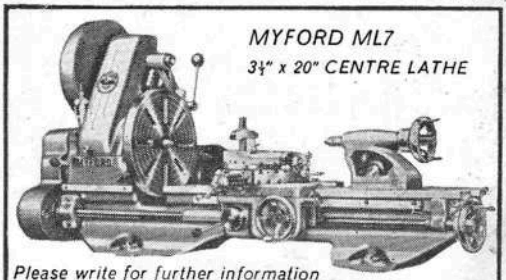

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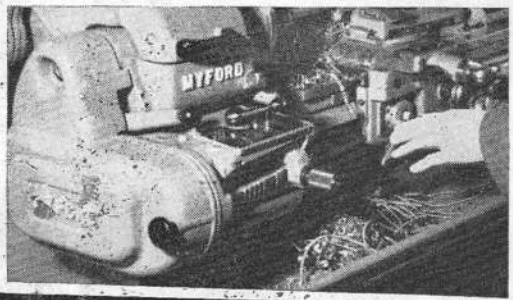

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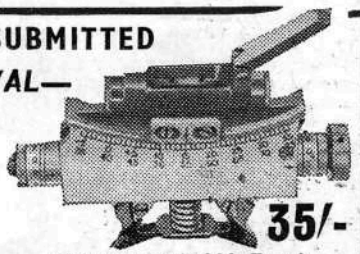

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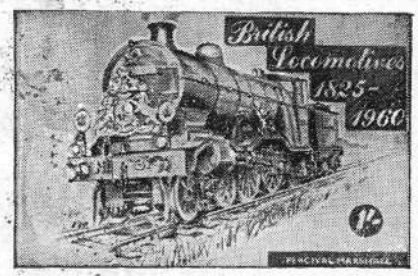

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